

## TALIPARITI (MALVACEAE), A SEGREGATE FROM HIBISCUS

Paul A. Fryxell  
Section of Integrative Biology  
School of Biological Sciences  
University of Texas  
Austin, Texas 78712

**ABSTRACT.** *Talipariti* is segregated from *Hibiscus* L. in generic rank and described as new. In the past it has been variously treated in sectional rank, as *Hibiscus* sect. *Azanzae* DC., or in generic rank, either under the name *Pariti* Adans. or under the name *Paritium* A. St.-Hil., both of which are illegitimate (nom. rejic.). The circumscription of the group has been narrowed over previous interpretations by the exclusion of several species that evidently have other affinities. The narrowed group is here interpreted to have 22 species, one including two varieties. One new species is proposed, *Talipariti bowersiae*. The genus is largely tropical, although one species reaches temperate climates in Japan and Korea. *Talipariti* is found in Southeast Asia, New Guinea, the Greater and Lesser Antilles, and along the coasts of Australia, India, South and Central America, and islands of the Indian and Pacific Oceans. Several species have been taken into cultivation to some extent, largely as ornamental trees or shade trees, and one species (*T. elatum*) has been the subject of plantings on a small scale for timber production.

### INTRODUCTION

*Hibiscus tiliaceus* var. *tiliaceus* is a widespread and well-known tropical and subtropical strand species. Its natural distribution is largely Old World, on the shores of the Indian Ocean and around much of the Pacific Basin. It is also sometimes cultivated elsewhere as a shade tree or as an ornamental flowering tree. *Hibiscus tiliaceus* var. *pernambucensis* (Arruda) I. M. Johnst. is its equally abundant New World vicariad, occurring on both the Atlantic and Pacific shores of the American tropics. A small group of additional species, each of more limited distribution, centers taxonomically on these two taxa, and together they form a natural group, sometimes treated in sectional rank within *Hibiscus*, sometimes separated from *Hibiscus* and treated in generic rank. At the other extreme, these taxa are sometimes thrown together uncritically into one or a few species. Gürke (1892), for example, lumped at least four species (as recognized here) into a broadly conceived and heterogeneous *H. tiliaceus*, and Borssum Waalkes (1966) combined six species (as treated here) into one species (*H. tiliaceus*), treated as six subspecies. The index to botanical names at the end of this paper lists 19 names of infraspecific taxa in *Hibiscus tiliaceus* (including various ranks and combinations), indicating some of the past history of thinking on these plants.

*Hibiscus tiliaceus* and its allies are here excluded from *Hibiscus* and placed in a segregate genus comprising 22 species. Because the previously applied generic names are illegitimate, the new name *Talipariti* is proposed.

### TAXONOMIC HISTORY

When recognized in generic rank, the group has been treated under either of two names, *Pariti* Adans. or *Paritium* A. St.-Hil. Nicolson et al. (1988) state that



*Pariti* Adans. (1763) is an illegitimate renaming of *Hibiscus* L. (1753), but this interpretation is incorrect (D. H. Nicolson, pers. comm.). In proposing the genus *Pariti*, Adanson (1763) cited three elements: 1) *Hortus Malabaricus* of Rheede (1678), vol. 1, pl. 30; 2) the name 'Bupariti,' from *Hortus Malabaricus*, vol. 1, pl. 29, which was the basis for the generic name by Duhamel (1760); and 3) two species of *Hibiscus*, numbers 3 and 4, from Linnaeus's *Species Plantarum* (1753: 694). These two Linnaean species are 3. *H. populneus* L. and 4. *H. tiliaceus* L.; for the former, Linnaeus cited Rheede's plate 29 and for the latter Rheede's plate 30. Adanson therefore did not rename the genus *Hibiscus*, but rather selected two of Linnaeus's 20 species of *Hibiscus* and proposed them to be a segregate genus. The name *Thespesia* Sol. ex Corrêa has been conserved over *Bupariti* Duhamel. The species depicted in Rheede's plate 29 is now recognized as *Thespesia populnea* (L.) Sol. ex Corrêa. The plant shown in plate 30 is *Hibiscus tiliaceus* L.

Duhamel (1760) published the generic name *Bupariti*, taking the name directly and explicitly from the vernacular name given by Rheede (1678). In addition to citing Rheede's description of 'Bupariti,' he also cited Linnaeus's polynomial phrase name for *Hibiscus populneus* L., which is therefore the type of the generic name *Bupariti*.

Three years later, Adanson (1763) published the generic name *Pariti*, citing in the synonymy *Bupariti* Duhamel. Thus, Adanson's name is a nomen superfluum, and it has the same type (*Hibiscus populneus*) as the name that he should have adopted, viz. *Bupariti*. Thus, both *Bupariti* and *Pariti* are homotypic synonyms of *Thespesia*, which is conserved over *Bupariti*.

St.-Hilaire (1828) proposed the name *Paritium* as an orthographic variant of *Pariti*, which he cited in synonymy. Thus it, too, has the same type as both *Pariti* and *Bupariti*, and it, too, must be rejected against the conserved *Thespesia* (ICBN, Art. 14.4). Therefore, none of the generic names that have been applied to the species under discussion here are in fact applicable, except *Hibiscus* itself if one chooses to retain them within this heterogeneous assemblage. The sectional name, *Hibiscus* sect. *Azanzae* DC., cannot be elevated to generic rank because it would then become a later homonym of the name *Azanza* Alef. (Bot. Zeit. 19: 298. 1861), which is typified by *Azanza lampas* (Cav.) Alef. [= *Thespesia lampas* (Cav.) Dalzell & Gibson].

Britton's (1918) lectotypification of *Pariti* with *Hibiscus tiliaceus* is therefore in error, and St.-Hilaire's establishment of *Paritium* on the basis of the single species *Hibiscus tiliaceus* is also in error, since both are typified by *Hibiscus populneus*, which is the type of *Thespesia* by conservation. Since none of the generic names here cited can be applied to the group discussed, a new name is required and is supplied here, taken from the vernacular name 'Talipariti' of Rheede's (1678) reference to his plate 30, headed 'Pariti, seu Tali-Pariti.'

The etymology of the name is found in Nicolson et al. (1988). 'Pariti' "is a general reference to *Hibiscus*," and the prefix 'Tali-' "means slimy and bark strips contain mucilage [and are] used by native women for shampoo."

Subsequent authors who have treated these species as generically distinct from *Hibiscus* have either used the name *Pariti* (e.g., Britton 1918; Britton & Millspaugh 1920; Britton & Wilson 1924; Williams & Cheesman 1929; Small 1933; Gooding et al. 1965; Airy-Shaw 1966; Dandy 1967) or they have used the name *Paritium* (e.g., Wight & Arnott 1834; Walpers 1842; Gray 1854; Grisebach 1859;



Baillon 1875; Eggers 1879; Hillebrand 1888; Duss 1897; Questel 1941). Similarly, those authors who have retained the species in *Hibiscus* have cited synonyms either as in *Pariti* (e.g., Kearney 1955; Correll & Correll 1982; Proctor 1984; Nicolson et al. 1988) or as in *Paritium* (e.g., Steudel 1841; Bentham & Hooker 1863; Seemann 1865–1873; Hooker 1872; Boldingh 1909; Urban 1910, 1920; Ewart & Davies 1917; Ridley 1922; Sauget & Liogier 1953; Bates 1965; Walker 1976; Fournet 1978; Sivarajan & Pradeep 1996). Only Kearney (1951) and Hutchinson (1967) have cited both *Pariti* and *Paritium* as synonyms of *Hibiscus*. Hooker and Arnott (1841) equivocally include these species sometimes in *Hibiscus*, sometimes in *Paritium*. Numerous other authors have included them in *Hibiscus* without the citation of synonyms. Nevertheless, there is clearly a strong sentiment for segregating this group from *Hibiscus*, but divided opinion on whether to use the name *Pariti* or the name *Paritium*; recent authors favored the name *Pariti*, earlier authors tended to use *Paritium*. As shown above, neither name can be used.

Mabberley (1987) and Wielgorskaya (1995), presumably following *Index Nominum Genericorum*, state that *Pariti* is the same as (i.e., a synonym of) *Thespesia* but give no explanation; however, the line of reasoning elaborated above justifies this position.

There remains the question of the gender of the generic name. Adanson did not indicate the gender of *Pariti*. According to Art. 62.3 (ICBN), its gender is that indicated by the “next subsequent author” who used the name and who must be followed. In the present case, this would evidently be Voigt (1845), who treated the name *Pariti* as neuter. Since the name *Talipariti* is etymologically equivalent to the name *Pariti*, this precedent will be followed and *Talipariti* is also treated as neuter.

Candolle’s conception of *Hibiscus* sect. *Azanzae* was broadened by Hochreutiner (1900) to include other species in addition to those that pertain to the group discussed here. Borssum Waalkes (1956, 1966) also included species of *Hibiscus* sect. *Azanzae* that do not pertain to the genus *Talipariti* (see below). The type of *Hibiscus* sect. *Azanzae* (*Hibiscus azanzae*) is a synonym of *Talipariti elatum*, so that sect. *Azanzae* is correctly a synonym of the genus *Talipariti*, though with a narrowed circumscription.

Borssum Waalkes (1956) described a number of new species of *Hibiscus* and placed them in *H.* sect. *Azanzae*. On the basis of the descriptions and illustrations, some of these can be recognized as belonging to *Talipariti*, others are probably to be excluded. Clearly included in *Talipariti* on the basis of the nature of the stipules and stipule scars are *H. aruensis*, *H. borneensis*, *H. leeuwenii*, *H. fluminis-idenburgii*, *H. archboldianus*, *H. lepidotus*, and *H. pseudotiliaceus*; *H. ellipticifolius* has the distinctive calyx nectaries, as well as the characteristic stipules. Although these prominent nectaries are curiously not mentioned in the original description, they are later noted by Borssum Waalkes (1966) as characteristic of *H. ellipticifolius*.

Other species included by Borssum Waalkes in *Hibiscus* sect. *Azanza* (Borssum Waalkes 1966) are here excluded from *Talipariti* and are omitted from the present treatment. These are *Hibiscus carrii* Borss. Waalk. (type: Carr 13219, A! L! NY!), *Hibiscus floccosus* Masters (type: Maingay 216, GH! K! L!), *Hibiscus sciadolepidus* (Hochr.) Borss. Waalk. (type: Janowsky 402, L!), *Hibiscus pulvinulifer* Borss. Waalk. (type: Docters van Leeuwen 9280, A! K! L!), *Hibiscus decaspermus* Koord. & Valetton (type: Koorders 4561, K! L!), and *Hibiscus teijsmannii* Borss. Waalk. (type: Teijsmann 12597, L!), all of which appear to have other affinities.



## DELIMITATION OF TALIPARITI

The salient distinguishing features of *Talipariti* include the following characteristics.

1) Large, often more or less oblong stipules (Figs. 1, 5), pairs of which enclose and conceal the developing terminal bud, but which are deciduous, leaving characteristic annular scars. The nature of the stipules (form and placement) and of their scars is virtually diagnostic. They reach their most developed (exaggerated) form in *T. macrophyllum* (Fig. 1a), sometimes reaching a size of 11 cm long and 3 cm wide in this species.

2) Calyx lobes with nectaries on the midribs (Figs. 2i, 5b), present in some (but not all) species of *Talipariti*. Nectaries on the calyx lobes are otherwise unknown in the Malvaceae, with the exception of most species of *Hibiscus* sect. *Furcaria* DC., a group that is evidently not allied to and which cannot be confused with *Talipariti*.

3) Distinctive fruit structure (a 5-valved capsule with "false dissepiments" that make it seem imperfectly 10-loculed). Borssum Waalkes (1956) notes that some species (e.g., *T. dalbertisii*) possess these false dissepiments and other species (e.g., *T. macrophyllum*) do not. Further studies of comparative anatomy (especially of the development of the false dissepiments) of the fruit structure in *Talipariti*, as compared to other representatives of *Hibiscus* sens. lat., are warranted to evaluate the significance of capsule structure in defining *Talipariti*. Observations of several of the species with mature fruits, however, indicate that the 5-valved capsules at maturity have endocarps that separate from the exocarp and maintain their integrity as two separate halves. Thus, a mature 5-valved capsule may appear to be 10-valved and is sometimes so described in the literature. In my opinion, the fruits of *Talipariti* are uniformly 5-carpelled, as is true of the entire tribe Hibisceae (with the rarest of exceptions), and that those descriptions of species of *Talipariti* that say "10-carpelled" are in error.

4) Some species have a gamophyllous, cupuliform involucl with numerous dentate or lanceolate teeth, the involucl generally shorter than the calyx but occasionally subequal to the calyx (Fig. 2a, 2d-j). This character is distinctive of many species of *Talipariti*, but other species (especially those from New Guinea) have 5 to 10 distinct involucellar bracts, presumably representing a less specialized condition (Fig. 2k-r).

5) A relatively large chromosome number is characteristic, insofar as the species are known cytologically. Counts are reported in the literature (Youngman 1927; Longley 1933; Skovsted 1935, 1941; Skottsberg 1955; Pushparajan et al. 1986; Butorina et al. 1990) of  $2n = \text{ca. } 80$ ,  $2n = 90$ ,  $2n = \text{ca. } 92$ ,  $2n = \text{ca. } 96$ , and  $2n = 120$ , for *T. elatum*, *T. hastatum*, and *T. tiliaceum*. Since many of these counts are unvouchered, it is not certain precisely which species was studied, but there is little doubt that all of the cited counts pertain to the genus *Talipariti*. The large number of chromosomes may be definitive, but sufficient cytological data are not yet at hand to be certain.

6) An arborescent habit, which is characteristic of but not unique to *Talipariti*, but none the less unusual in the Malvaceae.

7) Broadly ovate or elliptic leaves (lobed in *T. hastatum*) that are entire or finely denticulate, usually leathery in texture, and often bear one to several foliar nectaries on the principal veins abaxially, though these are absent or obscure in three or four species. The foliar nectaries (Fig. 5a), while characteristic of *Talipariti*,



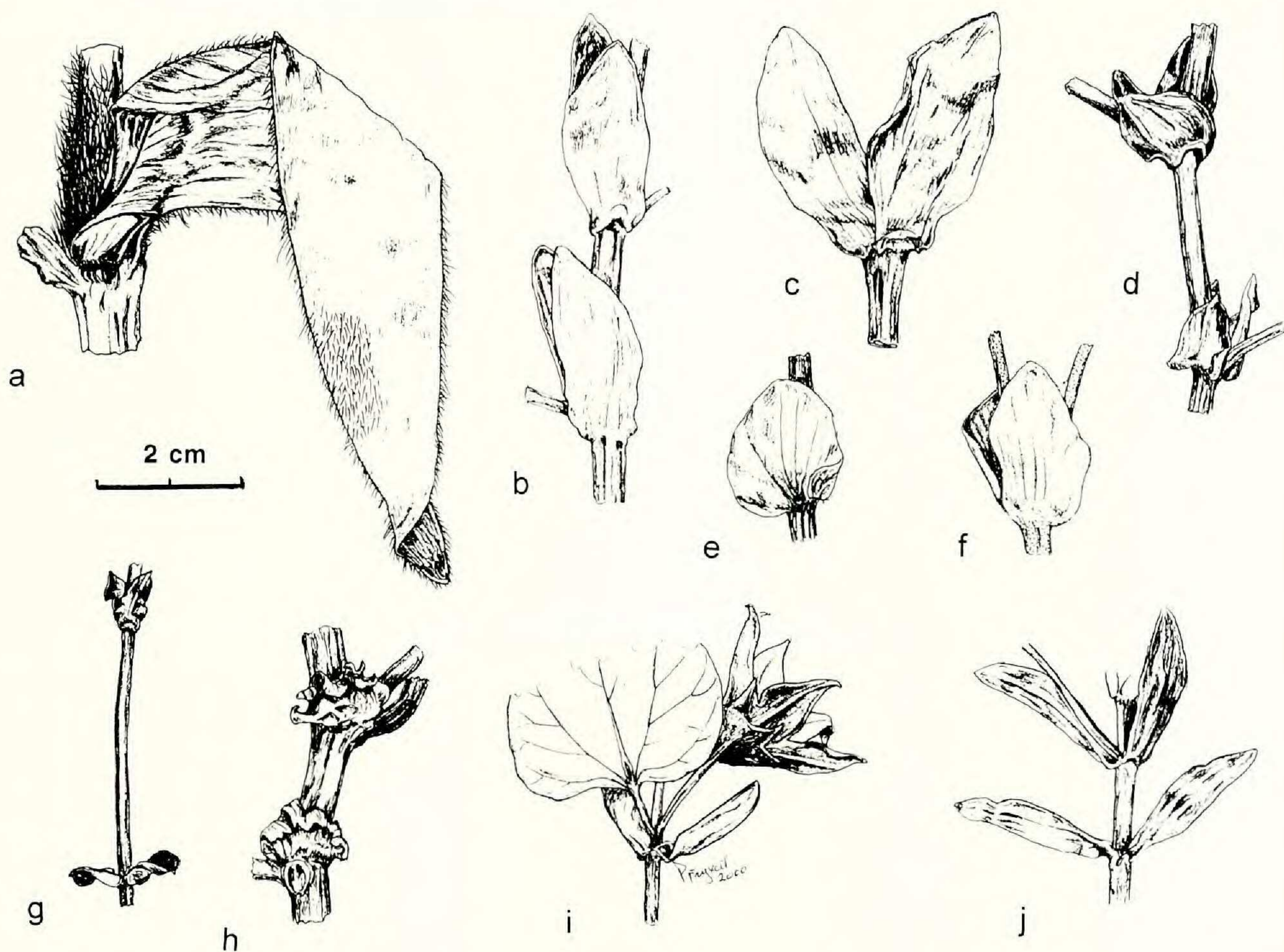


FIG. 1. Representative stipules of *Talipariti*. a. *T. macrophyllum*, the pubescence only partially indicated. b. *T. tiliaceus* var. *pernambucense*. c. *T. elatum*. d. *T. dalbertisii*. e. *T. pleijtei*. f. *T. archboldianum*. g. *T. sepikense*. h. *T. borneense*. i. *T. hamabo*. j. *T. glabrum*. Based on: a, Koorders 4577B (L); b, D'Arcy & Croat 4090 (TEX); c, Fawcett & Harris 7046 (MO); d, Schrijn 3594 (L); e, Koster 1498 (L); f, van Royen NGF-20194 (L); g, Darbyshire & Hoogland 8350 (L); h, Kostermans 6758 (L); i, Waimea Botanic Garden 74c1527 (TEX); j, Fosberg 31475 (TEX).

also occur in various other genera of Malvaceae (e.g., *Gossypium* L., *Hampea* Schldtdl., *Hibiscus*, *Kydia* Roxb., *Thespesia*, *Urena* L.) and may also be found in other families, such as Sterculiaceae (e.g., *Byttneria* Loefl.; Arbo 1972).

Other characters are less definitive, but taken together the combination of characters listed above clearly sets off *Talipariti* from other species of *Hibiscus* sensu lato. and from other members of the tribe Hibisceae (cf. Fryxell 1997). Thus, there is ample justification for recognizing *Talipariti* in generic rank. Using the criteria for recognizing segregate genera propounded by McVaugh (1945) and concisely summarized by Gillis (1971) and Grashof (1975), the recognition of *Talipariti* is generally supported by all of the eight criteria put forward by these authors.

#### SUBDIVISION OF TALIPARITI

It is tempting to subdivide the genus into two sections or subgenera, for those species (on the one hand) that have distinct involucellar bracts, pink or red corollas, and ferruginous-wooly seeds in contrast to those species (on the other hand) that have gamophyllous (toothed) involucels, yellow corollas, and short-pubescent to subglabrous seeds. These two groups of species, moreover, seem also to have geographical integrity as well. However, there are exceptions to this pattern



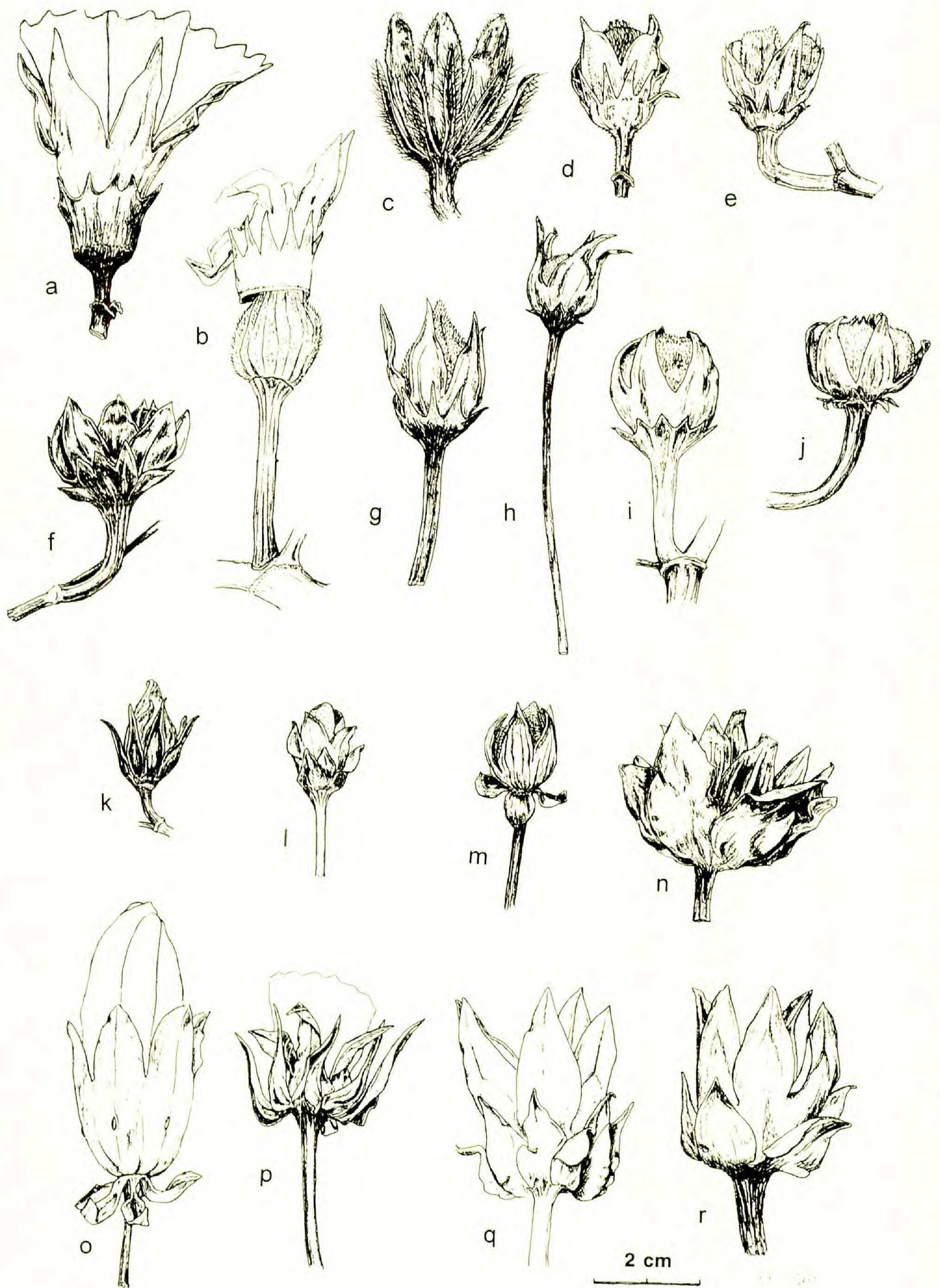


FIG. 2. Involucel and calyx of *Talipariti*. a. *T. elatum* in anthesis. b. *T. elatum*, post-anthesis, showing dehiscence of involucel and calyx as a unit. c. *T. macrophyllum*, post-anthesis. d. *T. simile* in fruit. e. *T. hastatum* in fruit. f. *T. celebicum* in fruit. g. *T. hamabo* in fruit. h. *T. glabrum* in fruit. i. *T. tiliaceum* in fruit. j. *T. potteri* in fruit. k. *T. crestaense* in bud. l. *T. sepikense*, pre-anthesis. m. *T. pleijtei* in fruit. n. *T. pseudotiliaceum*, post-anthesis. o. *T. ellipticifolium*, pre-anthesis. p. *T. aruense* in flower. q. *T. dalbertisii*, post-anthesis. r. *T. archboldianum* in anthesis. Based on: a, Lundell 16975 (LL); b, Wetmore & Abbe 757 (A); c, Griffith 477 (GH); d, Hort. Bogor. 47 (TEX); e, MacDaniels 1697 (TEX); f, Koorders 17019b (L); g, Waimea Bot. Gard. 74c1527 (TEX); h, Fosberg 31505 (TEX); i, Fosberg 26682 (US); j, Degener 23758 (US); k, Ramos 76992 (K); l, Darbyshire & Hoogland 8234 (K); m, Kalkman 6310 (K); n, Tangkilianian 229 = Kostermans 33899 (L); o, Hoogland 4880 (L); p, Brass & Versteegh 13126 (L); q, Ridsdale et al. NGF-31960 (K); r, Brass 7092 (L).



(notably *T. celebicum*, *T. macrophyllum*, and *T. pseudotiliaceum*) that indicate that this simple dichotomy is not tenable in our present state of knowledge. In addition, the interpretation of *T. simile* as a hybrid between *T. macrophyllum* and *T. tiliaceum* (see below) indicates that the apparent subunits are not very widely separated genetically. Therefore, no subdivision of the genus *Talipariti* is proposed here.

### GENERIC AFFINITIES

The generic affinities of *Talipariti* are largely speculative at the present time. The genus was segregated from a broadly conceived *Hibiscus*, but its phylogenetic affinities are perhaps to be sought elsewhere. The strong morphological similarity between *Talipariti schlechteri* and *Wercklea woodsonii* (A. Robyns) Fryxell (see below) suggests a possible tie between these two genera (cf. Fryxell 1981). Shared characters include large foliaceous stipules, the arborescent habit, possibly similar (large) chromosome numbers, and to a lesser degree the elongated, ligneous pedicels (of *T. schlechteri* and *T. glabrum*) and the pentangular capsules (of *T. bowersiae* and *T. leeuwenii*), both characteristic of most species of *Wercklea* Pittier & Standl. Differences between these two genera include the absence of both foliar and calyx nectaries in *Wercklea*; the different form, placement, and persistence of the stipules in the two genera; and the frequent presence of thorns in *Wercklea* and their absence in *Talipariti*. As stated, this connection of *Talipariti* and *Wercklea* is largely speculative, but noting it may give direction to future phylogenetic studies.

### TAXONOMY

**Talipariti** Fryxell, gen. nov.—TYPE: *Talipariti tiliaceum* (L.) Fryxell [basionym: *Hibiscus tiliaceus* L.].

*Hibiscus* sect. *Azanzae* DC., Prodr. 1: 453. 1824, non *Azanza* Alef., Bot. Zeit. 19: 298. 1861.—TYPE: *Hibiscus azanzae* DC. [= *Talipariti elatum* (Sw.) Fryxell.

Arbores 3–50 m altae; laminis foliorum plerumque late ovatis (rare ellipticis vel plus minusve lobatis) saepe nectariis foliorum; stipulis prominentibus sessilibus atque amplexicaulis, ad caulis adpressis et gemmam includentibus, deciduis cicatricibus annularibus relictis; pedicellis saepe solitariis interdum in sympodiis; involu-cellis aut gamophyllis atque cupuliformibus aut 5–10 bractearum distinctorum; calyce 5-lobato, costis loborum interdum nectariis centralis; corolla campanulata ampla et speciosa, lutea vel rosea vel rubra, centro obscuro praesenti vel carenti; fructibus capsularis dehiscentibus ovoideis vel subglobosis dense pubescentibus; seminibus per loculum duabus vel aliquot pubescentibus vel glabris ut videtur.

Trees (rarely shrubs) 3–50 m tall, the trunks erect or spreading, sometimes angularly branched, the twigs minutely lepidote, puberulent, stellate-pubescent, or with long simple hairs, often glabrescent. Leaf blades often coriaceous, sometimes discoloured, ovate (rarely elliptic or obovate, sometimes deeply lobed in *T. hastatum*), basally rounded to deeply cordate (rarely cuneate), apically acute or short-acuminate, the margins usually entire (or sometimes obscurely crenulate or denticulate), palmately (or sometimes pedately) nerved, sometimes with one or more nectaries on the abaxial side of the nerves (nectaries usually solitary near



base of blade or less commonly several, more distally placed, sometimes absent); petioles usually shorter than (rarely subequal to) the blade, with pubescence similar to that of the young branches although sometimes denser; stipules prominent, lance-ovate to oblong (rarely subfalcate or suborbicular), from 0.5–3 cm long to as much as 11 cm long in *T. macrophyllum*, sessile and amplexicaul at shoot apex (appressed to stem and enclosing the terminal bud), variously pubescent to glabrescent, rarely spreading or somewhat reflexed, usually early deciduous, leaving prominent annular scars. Pedicels solitary in the upper leaf axils, usually stout and relatively short (rarely exceeding the petioles, except much longer than the petioles in *T. glabrum* and *T. schlechteri*), sometimes aggregated terminally or on short side-branches in few-flowered (or up to 9-flowered in *T. potteri*) sympodial inflorescences; involucler either gamophyllous and cupuliform with 8–12 (or more) dentate or lanceolate teeth or of 5–10 distinct elements, each ligulate to lanceolate to cordate-ovate; calyx 5-lobed (ca. half-divided or sometimes deeply divided), the lobes often costate, more or less plicate in bud distally, with or without a nectary on the midrib of each lobe; corolla campanulate (reflexed in *T. borneense*), usually large and showy, yellow (with or without a purplish center), white, rose-pink, red, or purplish (sometimes changing color on falling, e.g., yellow to orange or red); staminal column included within corolla, basally pubescent (sometimes densely lanate forming a cushion) or glabrous, antheriferous distally or throughout length, apically 5-dentate; styles emergent from the staminal column, distally distinct, sometimes pubescent, the 5 stigmas capitate or obliquely capitate, sometimes purplish. Capsules subglobose or ovoid (rarely obovoid), externally densely pubescent (the hairs often yellowish, lepidote, stellate, or simple, sometimes in combination), internally glabrous or sometimes densely woolly, 5-locular but sometimes apparently 10-locular as a result of the presence of false papery dissepiments; seeds 2 to many per carpel, reniform, 3–5 mm long, densely pubescent to seemingly glabrous (though minutely papillate or scabridulous).

The species of *Talipariti* seem to be flowering and fruiting in all months of the year, although data is scant for several species. Only for *T. hamabo* and perhaps for *T. ellipticifolium* is a clear seasonal pattern evident.

#### KEY TO THE SPECIES OF TALIPARITI

1. Plants prominently shaggy-hirsute, especially the young growth, the yellowish hairs 5–8 mm long; leaves large (to 40 cm long, 50 cm wide) with distally positioned nectaries on the principal veins beneath; stipules 3–11 cm long, 1.5–3 cm wide. 14. *T. macrophyllum*.
1. Plants glabrous to pubescent or lepidote, the hairs less than 1.5 mm long; leaves sometimes to 30 cm wide but usually smaller with nectaries basally positioned or absent (except distally positioned in *T. simile*); stipules 1–3 cm long, 0.4–1.8 cm wide.
  2. Involucellar bracts 5–10, distinct or nearly so, sometimes more or less revolute laterally toward base.
    3. Corolla yellow with a red center or “pale yellow and peach”; involucellar bracts 5–10, ligulate to narrowly ovate, not revolute; leaf blades to 10 cm long.
      4. Young stems sparsely pubescent to glabrescent; leaf blades about as wide as long; involucellar bracts 7–10; corolla bright yellow with a crimson center. 22. *T. tortuosum*.
      4. Young stems densely ferruginous-puberulent; leaf blades longer than wide; involucellar bracts 5–8; corolla “pale yellow and peach”. 4. *T. bowersiae*.
    3. Corolla white or violet; involucellar bracts 8–10, narrowly ovate or cordate-lanceolate and more or less revolute laterally toward base (Fig. 2p); leaf blades 8–20 cm long.
      5. Leaf blades 8–13 cm long, longer than wide, the foliar nectary elongate (13–20 mm long); petioles 3.5–6 cm long; stipules minutely puberulent; staminal column 5–8 cm long, subequal to petals, the filaments 5–7 mm long; petals violet, not reflexed. 2. *T. aruense*.



5. Leaf blades 12–20 cm long, somewhat wider than long, the foliar nectary absent; petioles 10–15 (–20) cm long; stipules roughly pubescent, the hairs to 1 mm long; staminal column 3 cm long, shorter than petals, the filaments ca. 2 mm long; petals white (but drying “greenish white tinged with pink”), reflexed. 3. *T. borneense*.
2. Involucellar bracts 5–8 and distinct, or gamophyllous and forming a cupuliform structure with 8–12 (or more) teeth.
6. Involucellar bracts distinct or nearly so, 5–8, lanceolate or cordate-ovate; foliar nectaries present or absent; corolla pink or red to purple (except yellow in *T. pseudotiliaceum*).
7. Foliar nectaries absent; petals yellow, rose-pink, or red.
  8. Petals yellow, 5 cm long; calyx 2–3 cm long. 17. *T. pseudotiliaceum*.
  8. Petals rose-pink or red, 9–10 cm long; calyx 3–4 cm long.
  9. Herbage minutely lepidote; staminal column shorter than the petals, the filaments 2–4 mm long; capsules lepidote-pubescent; calyx nectaries absent. 1. *T. archboldianum*.
  9. Herbage stellate-pubescent; staminal column subequal to petals, the filaments 4–8 mm long; capsules strigose-pubescent; calyx nectaries present. 7. *T. dalbertisii*.
7. Foliar nectaries present; petals pink or red to purple.
  10. Petals 7–8 cm long; involucellar bracts lanceolate, 3–5 mm wide, narrowed at the base, more or less reflexed (Fig. 2o). 9. *T. ellipticifolium*.
  10. Petals 2.5–4 cm long; involucellar bracts cordate-ovate, 3–20 mm wide, not reflexed.
    11. Involucel 2.5–3 cm long; calyx 2.5–5.5 cm long; staminal column (not seen) pubescent at base but presumably not forming a cushion.
    12. Pedicels 1–4 cm long; calyx 2.5–3 cm long; fruits 3 cm long; involucel subequal to calyx. 13. *T. leeuwenii*.
    12. Pedicels 10–14 cm long; calyx 5–5.5 cm long; fruits 4–4.5 cm long; involucel shorter than calyx. 18. *T. schlechteri*.
    11. Involucel 0.5–1.2 cm long; calyx 1.2–1.6 cm long; staminal column densely lanate at base (at juncture with petals), forming a cushion.
    13. Petals pink, 3–4 cm long; involucel 5–7 mm long; stipules (Fig. 1g) ovate, 7–10 mm long, 5–8 mm wide. 19. *T. sepikense*.
    13. Petals red to purple, 2.5–3 cm long; involucel 8–12 mm long; stipules (Fig. 1e) oblong to subrotund, 10–25 mm long, 5–18 mm wide. 15. *T. pleijtei*.
6. Involucellar bracts gamophyllous, forming a cupuliform structure with 8–12 (or more) triangular or lanceolate teeth (Fig. 2d–j); foliar nectaries usually present; corolla yellow, often with a dark red center.
  14. Staminal column 7–8 cm long; calyx and involucel abscising circumscissily post-anthesis (Fig. 2b); calyx 3–5 cm long; petals 7–12 cm long, about twice (or more) as long as wide. 8. *T. elatum*.
  14. Staminal column 1–3.5 cm long; calyx and involucel persistent in fruit; calyx 1–3 cm long; petals 3–7 cm long, 1–1.5 (–2) times as long as wide.
  15. Foliar nectaries distally placed (1/3–2/3 distance from base of blade to apex). 20. *T. simile*.
  15. Foliar nectaries basal (i.e., near attachment of petiole) or absent.
    16. Leaf blades 6.5–30 cm long, 4.5–30 cm wide; calyx 10–20 mm long.
      17. Flowers solitary in the leaf axils; calyx 10–12 mm long; involucel not reflexed (Fig. 2f); seeds densely woolly with ferruginous hairs ca. 2 mm long; maximum size of leaf blades to 30 cm long and wide. 5. *T. celebicum*.
      17. Flowers borne on extended sympodia; calyx 18–20 mm long; involucellar teeth more or less reflexed in fruit (Fig. 2j); seeds appearing glabrous but actually minutely papillate; leaves to 17 cm long and 22 cm wide. 16. *T. potteri*.
    16. Leaf blades 17 cm long and 12 cm wide, or smaller; calyx 15–28 mm long.
      18. Base of leaf blade truncate to cuneate; leaf blades unlobed (and narrowly lanceolate or ovate) to prominently 3-lobed, the lobes triangular-acute; flowers often borne on extended sympodia. 12. *T. hastatum*.
      18. Base of leaf blade rounded to cordate; leaf blades unlobed, usually broadly ovate (or obovate in *T. hamabo*), acute or acuminate; flowers usually solitary in the leaf axils.



19. Leaf blades 10 cm long or less, basally rounded to cordate.
20. Pedicels (in fruit) 5–7.5 cm long (Fig. 2h); leaf blades basally rounded or shallowly cordate, glabrous beneath, ovate, acute or acuminate; stipules glabrous, with contrasting white margins; Bonin Islands. 10. *T. glabrum*.
20. Pedicels (in fruit) 0.3–1.2 cm long; leaf blades basally cordate, pale puberulent beneath, obovate (broadest above the middle), acuminate; stipules externally pubescent, the margins not contrastingly colored; Japan, Korea, cultivated elsewhere. 11. *T. hamabo*.
19. Leaf blades often more than 10 cm long, basally rounded to deeply cordate.
21. Leaf blades basally rounded to shallowly cordate, ovate to oblong-elliptic or somewhat obovate, 3–9 cm wide; foliar nectaries absent; seeds pubescent. 6. *T. crestaense*.
21. Leaf blades deeply cordate, broadly ovate, usually 10 cm wide or more; foliar nectaries present; seeds minutely papillate (Fig. 5e). 21. *T. tiliaceum*.

**1. *Talipariti archboldianum*** (Borssum Waalkes) Fryxell, comb. nov. *Hibiscus archboldianus* Borssum Waalkes, *Reinwardtia* 4(1): 59, fig. 9. 1956.—TYPE: NEW GUINEA. [PAPUA NEW GUINEA. Western:] Palmer River, 2 mi below junction of Black River, 100 m, Jun 1936, *Brass* 7092 (holotype: BO; isotypes: A! BM, L!).

*Hibiscus womersleyanus* Borssum Waalkes, *Reinwardtia* 4(1): 61, fig. 10. 1956.—TYPE: NEW GUINEA. [PAPUA NEW GUINEA. Madang:] “Central Highlands District,” Aiyura, 1800 m, 25 Nov 1950, *Womersley-NGF* 3386 (holotype: LAE; isotypes: A! BO, BRI, L! SING; photo of K isotype: TEX!).

*Hibiscus lepidotus* Borssum Waalkes, *Reinwardtia* 4(1): 63, fig. 11. 1956.—TYPE: NEW GUINEA. [PAPUA NEW GUINEA. Central:] Mt. Tafa, sheltered valley forests, 2400 m, *Brass* 4950 (holotype: BO; isotypes: A! BM, BRI).

Figs. 1f, 2r.

Trees 8–50 m tall, the twigs minutely and sparsely lepidote, the scales ca. 0.1 mm in diameter. Leaf blades ovate, [5?–] 14 cm long, [4?–] 11 cm wide, basally rounded to subcordate, the margin entire, apically acuminate, palmately 7-nerved, sparsely and minutely lepidote-pubescent on upper surface (especially along veins), more densely so on lower surface, slightly discolored, lacking foliar nectaries; petioles 5–7 cm long, with pubescence like stem; stipules (Fig. 1f) lance-ovate, 1.5 cm long, 6–12 mm wide, minutely lepidote, sessile and amplexicaul, deciduous, leaving annular scars. Pedicels solitary in the leaf axils, 1–2 cm long (to 6 cm in fruit), stout (3–4 mm in diameter and swollen distally); involucellar bracts (Fig. 2r) 6, distinct or nearly so, cordate-ovate (and thus basally plicate), 18–20 mm long, ca. 15 mm wide, minutely lepidote; calyx (Fig. 2r) ca. 3.5 cm long, densely and minutely lepidote-pubescent, ca. half-divided, the lobes ca. 2 cm long, plicate distally in bud, lacking nectaries; petals 9–10 cm long, 3–3.5 cm wide, rose-pink or red, coarsely lepidote-pubescent externally; staminal column 7.5 cm long, more or less pubescent basally, filamentiferous distally, the filaments 2–4 mm long, styles emerging from staminal column, obscurely pubescent or subglabrous, the stigmas capitate, 1.5 mm in diameter. Capsules ovoid, 3–3.5 cm long, 2.5–3 cm in diameter, 5-locular (“10-celled”), densely yellowish lepidote, densely woolly internally; seeds numerous, [immature] reniform, 3–4 mm long, densely ferruginous-pubescent. Chromosome number unknown.



Phenology. Apparently flowering and fruiting throughout the year.

Distribution. New Guinea (see map in Borssum Waalkes, 1956: 42, fig. 1) and New Britain; in primary and secondary forest; 30–2400 m.

Illustrations. Borssum Waalkes (1956: figs. 9, 10, 11).

ADDITIONAL SPECIMENS EXAMINED. **Indonesia.** WEST IRIAN: below Okdenan, 05°S, 141°E, 1400 m, *Reksodihardjo* 530 (L). **Papua New Guinea.** WESTERN: Nomad River Subprovince, 10 km above the junction of Strickland and Tomu Rivers, 06°30'S, 142°08'E, 80 m, *Gideon LAE-76153* (A, L).—WESTERN HIGHLANDS: Hagen Subdistrict, lower Kaugel Valley, 2200 m, *Robbins* 440 (A, L).—MADANG: Aiyura, 1800 m, *Smith NGF-1047* (L); Aiyura 1900 m, *Womersley* 4425 (A, K, L).—EAST SEPIK: near Langu village, 40–200 m, *Takeuchi & Wiakabu* 10043 (A-2).—EASTERN HIGHLANDS: Okapa area, 2000 m, *Brass* 31835 (L); Kassam, 1370 m, *Brass* 32385 (L, NY); just above Akuna, 06°22'S, 145°56'E, 1700 m, *Hartley* 11985 (A, K, L); Okapa Subdistrict, between Wanatabi and Purosa, 1550 m, *Hartley* 13680 (A, L); Kainantu Subdistrict, Wanatabi–Puros road, 1800 m, 06°35'S, 145°40'E, *Henty & Katik NGF-41991* (A, K, L); Kainantu Subdistrict, Kassam Pass, 06°10'S, 146°5'E, 1300 m, *Kikori NGF-32706* (L); Kainantu Subdistrict, 1 mi E of Odentenu, 1900 m, *Pullen* 727 (L); Kainantu Subdistrict, Arau–Andandara road, 1600 m, 06°28'S, 146°5'E, *Striemann NGF-23962* (L).—CENTRAL: Kairuku Subdistrict, 1 mi W of Maipa village, 55 m, *Darbyshire* 864 (A, L); Kairuku Subdistrict, between Maipa and Inaukina villages, 50 m, *Darbyshire* 959 (L); Maigo, 10°10'S, 148°10'E, 30 m, *Kairo NGF-17263* (K, L); Port Moresby Subdistrict, Kuriva Forestry Area near Veimura River, 65 m, 09°5'S, 147°5'E, *Streiman & Kairo LAE-51549* (L); Goilala Subdistrict, road from Woitape to Kosipi, Uriko, 07°S, 147°E, 2000 m, *van Royen NGF-20194* (L); Subdistrict Rigo, near Oboha village, 56 m, 09°50'S, 148°5'E, *Wiakabu & Giyowosa LAE-70443* (L, US).—GULF: Kikori Subdistrict, Wabo dam site ridge 305° ridge face on Purari River, 250 m, 07°0'S, 145°10'E, *Conn et al. LAE-66290* (L).—SOUTHERN HIGHLANDS: near Waro airstrip 20 km SSW of Kutubu, 500–600 m, 06°31'S, 143°10'E, *Jacobs* 9235 (L); Kutubu patrol area, Ubogo, 490 m, *Takeuchi* 9114 (A).—WEST NEW BRITAIN: Kandrian Subdistrict, Pirilongi Village, 06°06'S, 150°45'E, 400 m, *Sayers NGF-21980* (L).

*Talipariti archboldianum* (Fig. 2r), *T. dalbertisii* (Fig. 2q), and *T. schlechteri* (Fig. 4) are the only pink- or red-flowered species with a calyx 3 cm long or more and petals 9–10 cm long. Only *T. elatum* with yellow corollas (Fig. 2a) has flowers of comparable size.

Collectors' notes state that the inner bark is used for making ropes (*Womersley* 3386), for making string (*Womersley* 4425), and that long strips of outer bark “are preferred material for flooring and sleep mats” (*Takeuchi & Wiakabu* 10043). The use of bark fibers for basketry is also reported (*Takeuchi* 9114).

**2. *Talipariti aruense*** (Hatusima ex Borssum Waalkes) Fryxell, comb. nov. *Hibiscus aruensis* Hatusima ex Borssum Waalkes, *Reinwardtia* 4(1): 44, fig. 2. 1956.—TYPE: MOLUCCAS. [INDONESIA. Maluku:] Aru Island, Pulau Wokam, Selibatabata, 40 m, 18 Jun 1938, *Buwalda* 5270 (holotype: BO; isotypes: A-2! BO, BRI, BZF, L, PNH, SING; photo of K isotype: TEX!).

Fig. 2p.

Trees 20–22 m tall, the twigs with minute stellate pubescence and simple hairs 0.5–0.7 mm long. Leaf blades ovate, 8–13 cm long, 6–10 cm wide, basally somewhat cordate, the margin entire, apically acute or acuminate, palmately 7–9-nerved (the nerves prominently raised beneath), very minutely stellate pubescent above and beneath (hairs 0.1 mm in diameter), with an elongate nectary 13–20 mm long near base of midrib beneath; petioles 3.5–6 cm long, minutely pubescent; stipules oblong-ovate, ca. 1 cm long, 6–7 mm wide, sessile and amplexicaul, acute, minutely puberulent, deciduous, leaving annular scars. Pedicels solitary in the leaf axils, 1–2 cm long, minutely pubescent; involucellar bracts (Fig. 2p) 8–10, distinct, cordate-lanceolate, 2 cm long, somewhat arcuate, minutely and densely (but obscurely) pubescent,



the bases auriculate (i.e., laterally reflexed), narrowed markedly to an acute (-acuminate) apex; calyx 16–20 mm long, subequal to or slightly exceeding involucl, yellowish puberulent, deeply divided, the calyx nectaries vestigial (?) or absent; petals 5–8 cm long, “violet,” externally stellate-lepidote-pubescent; staminal column 5–8 cm long, subequal to petals, basally stellate-pubescent, filamentiferous in distal half, the filaments 5–7 mm long; styles emergent from the staminal column, distally free, subglabrous, the stigmas obliquely capitate, 1.8 mm in diameter. Capsules narrowly ovoid, 3–4 cm long, 1.5 cm in diameter, hirsute with antrorse simple hairs 1.5–2 mm long and with minute stellate hairs interspersed, 10-locular [ex descr.]; seeds numerous, reniform, 2.5 mm long, densely stellate-pubescent, the hairs dark-ferruginous, 1–2 mm long. Chromosome number unknown.

Phenology. Collected in flower in March, June, and August; in fruit in July.

Distribution. Moluccas and New Guinea (see map in Borssum Waalkes, 1956: 42, fig. 1); in primary forest; 40–850 m.

Illustration. Borssum Waalkes (1956: 45, fig. 2).

ADDITIONAL SPECIMENS EXAMINED. **Indonesia.** WEST IRIAN: Idenburg River, 4 km SW of Bernhard Camp, 850 m, *Brass & Versteegh 13126* (A, L); Hollandia, Bernhard bivak, 50 m, *Neth. Ind. For. Service bb. 25688* (L).

*Talipariti aruense* is notable for its involucl of 8–10 distinct bracts, which are reflexed laterally and sharply acute apically. The staminal column is subequal to the corolla and bears filaments 5–7 mm long. Among the pink- or red-flowered species, only *T. dalbertisii* and *T. ellipticifolium* have filaments as long, but they have only 6 involucellar bracts and much larger calyces.

**3. *Talipariti borneense*** (Airy Shaw) Fryxell, comb. nov. *Hibiscus borneensis* Airy Shaw, Hook. Icon. Pl. 34, t. 3377. 1939.—TYPE: BORNEO [MALAYSIA] Sarawak: Dulit Trail, under 300 m, 30 Aug 1932, *Native Collector 1541* (lectotype, here designated: K-sheet 1; isotypes: A! K-sheet 2! L! SING; photos of lectotype and K isotype: TEX!). Fig. 1h.

Trees 30 m tall, the trunks to 80 cm in diameter, buttressed, the twigs minutely yellowish puberulent becoming glabrescent. Leaf blades broadly ovate, 12–20 cm long, somewhat wider than long, basally cordate (the sinus open), the margin entire, apically acute, palmately 7-nerved, the nerves raised beneath, glabrous above, very minutely and sparsely pubescent to almost glabrous beneath, lacking foliar nectaries; petioles 10–15 (–20) cm long, with pubescence like stem; stipules broadly orbicular and undulate, ca. 1 cm long and wide, sessile and amplexicaul, more or less reflexed and contorted (Fig. 1h), roughly pubescent (hairs to 1 mm long), apically rounded to subacute, relatively persistent. Pedicels solitary in the leaf axils, 2–5 cm long, minutely puberulent, slender; involucellar bracts 8–10, distinct, narrowly ovate, 1–1.5 cm long, 4–7 mm wide, spreading (in bud) to reflexed, minutely puberulent, more or less laterally reflexed; calyx 1.5–2 cm long, minutely yellowish puberulent, costate, ca. half-divided or less, lacking nectaries; petals 4–8 cm long, 2–4 cm wide, reflexed at anthesis, white (with yellowish base) but drying darker (“greenish white tinged with pink”), externally pubescent, bearded on margins of claw; staminal column 3 cm long, essentially glabrous, filamentiferous along entire length, the filaments ca. 2 mm long; styles emerging from staminal column, distinct for ca. 1 mm, hirsute, the stigmas capitate, 2–3 mm in diameter.



Capsules globose to ovoid, 1.5 cm long, 2 cm in diameter, 5-locular, externally densely stellate-lepidote pubescent and with scattered simple hairs (the latter 1–1.5 mm long), internally densely wooly, the hairs pallid, 3–4 mm long; seeds ca. 7 per locule, reniform, 3–4 mm long, densely lanate, the hairs 3–4 mm long, ferruginous. Chromosome number unknown.

Phenology. Probably flowering and fruiting throughout the year.

Distribution. Borneo; in moist primary forests; 5–300 m.

Illustrations. Airy Shaw (Hook. Icon. Pl. 34: t. 3377. 1939).

ADDITIONAL SPECIMENS EXAMINED. **Indonesia.** EAST KALIMANTAN: Loa Haur, W of Samarinda, 50 m, *Kostermans* 6758 (A, L-2); Loa Haur, W of Samarinda, 30 m, *Kostermans* 7010 (A, L), West Kutei, Belajan River near Tabang, 100 m, Aug 1957, *Kostermans s.n.* (L); Oost Koeti, Loa Doeri, 5 m, *Neth. Ind. For. Serv.* 24017 (A, L).

*Talipariti borneense* is the only species of *Talipariti* with manifestly reflexed petals.

**4. *Talipariti bowersiae*** Fryxell, sp. nov.—TYPE: PAPUA NEW GUINEA. Western Highlands: Hagen Subdistrict, Kurupili, Kepaka, Upper Kaugal, 7350 ft, 5 Feb 1969, *Bowers* 635 (holotype: US!; isotypes: CANB! US!). Fig. 3.

Arbores ramis nodosis, ramulis dense puberulis, pilis stellatis ferruginis; laminis foliorum ovatis discoloribus nectariis foliorum desititutis; stipulis lanceolato-ovatis sessilis amplexicaulibus; pedicellis axillaribus 1.5–2.5 cm longis dense pubescentibus; bracteis involucellorum 5–8 fere distinctis liguliformibus vel anguste ovatis; calyce 2.8–3.3 cm longo dimidio partito dense ferrugineo-pubescenti; capsulis 3–3.5 cm longis ovoidibus vel ellipsoidibus plus minusve pentangularibus dense pubescentibus.

Trees to 8 m tall, “gnarled and broken, trunk very irregular in shape,” the young stems densely puberulent, the hairs stellate, 0.2–0.4 mm long, ferruginous. Leaf blades ovate, 4–11 cm long, 2–9.5 cm wide, shallowly cordate, the margin entire, apically gradually acuminate, palmately 7-nerved, discolorous, the upper surface darker, minutely puberulent (the hairs scattered, stellate, less than 0.1 mm in diameter), the lower surface lighter and more or less ferruginous (the hairs denser, stellate, variable in size, the larger hairs up to 0.4 mm in diameter), lacking foliar nectaries; petioles 2–4.5 cm long, with pubescence like stem though often denser; stipules 1–2 cm long, 0.5–1 cm wide, lance-ovate, sessile and amplexicaul, densely and minutely pubescent externally, sparsely so internally. Pedicels solitary in the axils, 1.5–2.5 cm long, 2–3 mm in diameter, densely stellate-pubescent like petioles; involucl of 5–8 distinct or nearly distinct bracts, each ligulate to narrowly ovate, 2–2.5 cm long, 4–9 mm wide, minutely and obscurely lepidote (seemingly glabrous); calyx 2.8–3.3 cm long, ca. half-divided, densely ferruginous-puberulent (the hairs stellate, farinaceous), the lobes ecostate, nectary absent; petals 7–7.5 cm long, “pale yellow and peach,” externally densely stellate-pubescent; staminal column 5.5 cm long, stellate-pubescent, filamentiferous in distal half, the filaments 2–3 mm long [?], the anthers purplish; styles emergent from staminal column by 4–5 mm, the stigmas abruptly capitate, 2 mm in diameter. Capsules ovoid or ellipsoid, more or less pentangular, 3–3.5 cm long, 1.5 cm in diameter, 5-locular, with papery dissepiments, densely stellate-pubescent, the farinaceous hairs brownish to ferruginous, many-armed, variable in size, the largest 0.5 mm in diameter; seeds not seen.



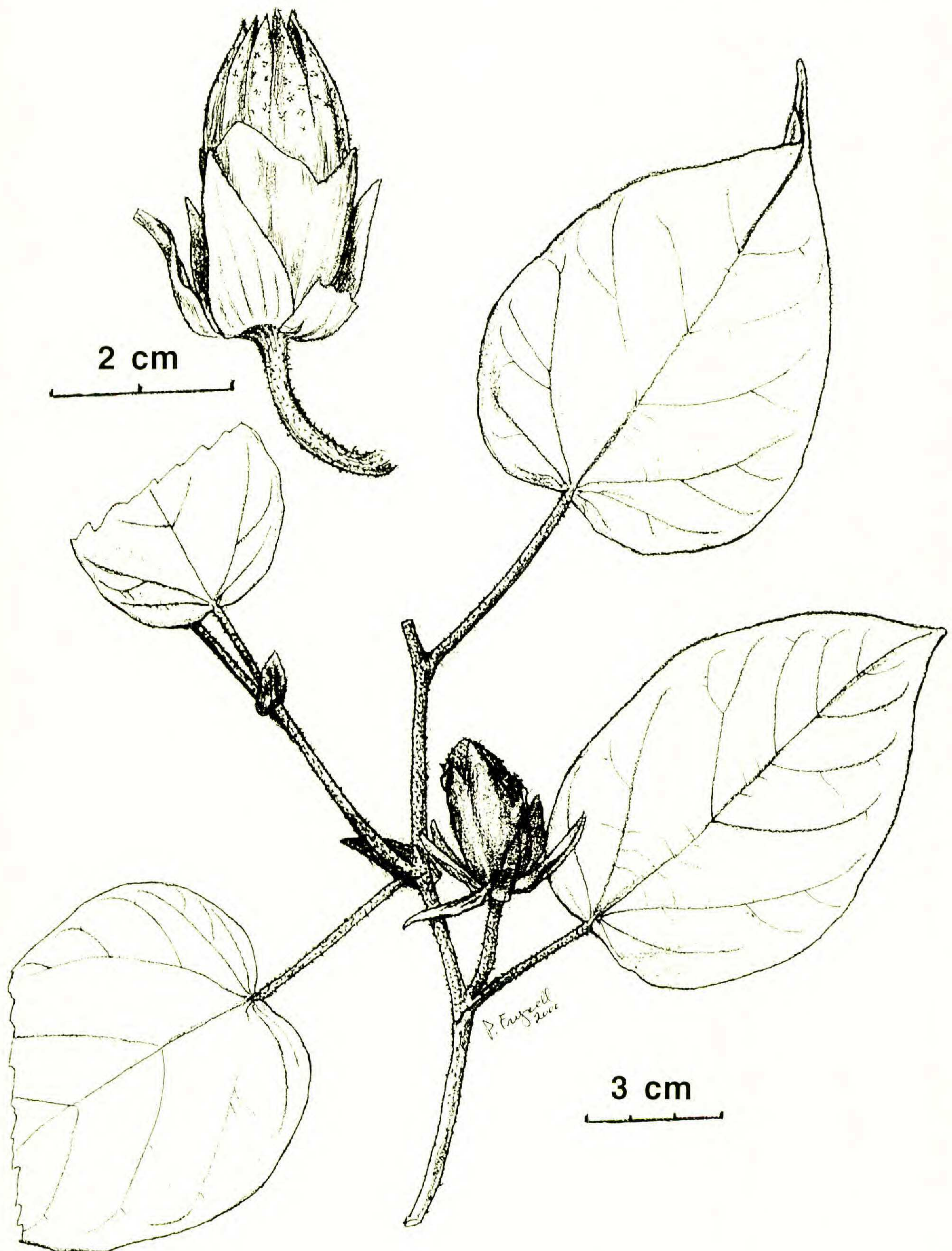


FIG. 3. *Talipariti bowersiae*. Flowering branch and separate fruit (Bowers 635)

*Talipariti bowersiae* is distinguished by its relatively narrow leaves and its dense, ferruginous puberulence on the stems, calyces, and fruits. It is known only from the type collection found "at streamside" in lower montane forest at ca. 2200 m elevation. The collector commented that "the bark yields fiber for pig rope."

The specific epithet is chosen to honor the collector of the type, Nancy Bowers (b. 1928), anthropologist from the University of Auckland.



**5. *Talipariti celebicum*** (Koorders) Fryxell, comb. nov. *Hibiscus celebicus* Koorders, Med. Lands Plantent. 19: 359, 632. 1898. *Hibiscus tiliaceus* subsp. *celebicus* (Koorders) Borssum Waalkes, Blumea 14: 35. 1966.—TYPE: CELEBES. [INDONESIA. North Sulawesi:] Kajuwatu, *Koorders 17820* (lectotype: BO; isotypes: BO, L!). Fig. 2f.

Trees 20–30 m tall with erect trunk, the young stems tomentose, the hairs stellate, 0.5–1 mm long. Leaf blades rounded-ovate, 6.5–30 cm long, 4.5–30 cm wide, basally deeply cordate, the margin crenulate to subentire, apically acuminate, palmately 5–7-nerved, nearly glabrous above, sparsely stellate-tomentose beneath, foliar nectaries absent; petioles 1.2–22 cm long, stellate-tomentose; stipules oblong, 2–2.5 cm long, 1–1.5 cm wide, stellate-tomentose on both surfaces. Pedicels solitary in the leaf axils, 0.5–1.5 cm long, 2–5 mm in diameter, accrescent in fruit to 2 cm long, stellate-tomentose; involucl (Fig. 2f) gamophyllous, forming a cup half as long as the calyx, the ca. 8 elements triangular, 5–8 mm long, ca. 4 mm wide; calyx (Fig. 2f) 10–20 mm long, densely stellate-pubescent, deeply divided, each lobe with a prominent midrib, lacking nectaries on the midribs; petals 3–4 cm long, 2.5–3.5 cm wide, yellow with purplish base; staminal column ca. 2 cm long, the filaments and anthers ca. 1 mm (sessile in illustration cited below); styles and stigmas unknown. Capsules subrotund, 2 cm long, 1.5–2 cm in diameter, number of locules unknown, antrorsely hirsute, the hairs yellowish, ca. 1 mm long; seeds 3.5–4 mm long, densely wooly with long (ca. 2 mm) ferruginous hairs. Chromosome number unknown.

Phenology. Collected in flower in March.

Distribution. Sulawesi (Minahassa Peninsula).

Illustration. Koorders (1922, fig. 65).

ADDITIONAL SPECIMENS EXAMINED. **Indonesia.** NORTH SULAWESI: Minahassa (Menado), 600 m, *Koorders 17816* (L), *Koorders 17819* (L), *Koorders 17823* (L).

*Talipariti celebicum* is distinguished by a combination of characters, as is indicated in the key to species

**6. *Talipariti crestaense*** (Borssum Waalkes) Fryxell, comb. et stat. nov. *Hibiscus tiliaceus* subsp. *crestaensis* Borssum Waalkes, Blumea 14: 36. 1966.—TYPE: THE PHILIPPINES. LUZON: Isabela Province, Mt. Cresta, 3 Apr 1929, *Ramos 76992* (holotype: K!; isotypes: NY! SING). Fig. 2k.

Trees 6 m tall, the trunk 20 cm in diameter, the young stems very sparsely stellate-cinereous, the hairs ca. 0.2 mm in diameter, becoming glabrescent. Leaf blades broadly ovate to oblong-elliptic or somewhat obovate, 7–17 cm long, 3–9 cm wide, basally rounded or shallowly cordate, the margin entire to slightly undulate-crenate, apically acuminate, palmately 5-nerved, the midrib raised beneath, glabrate above, sparsely stellate-cinereous (especially on veins) to subglabrous beneath, foliar nectaries absent; petioles 2.5–7 cm long, stellate-cinereous like stem; stipules 8–17 mm long, 4–6 mm wide, lance-ovate (or slightly asymmetrical), stellate-cinereous, deciduous, leaving prominent annular scars. Pedicels solitary in the leaf axils, 0.5–1 cm long, 2–2.5 mm in diameter, stellate-cinereous; involucl (Fig. 2k) more or less gamophyllous, half the length of the calyx or more, ca. 15 mm long, 10-parted, the segments 9–11 mm long, 2–4 mm wide, lanceolate, acute;



calyx 2–2.5 cm long, minutely puberulent, with a vestigial nectary on the midrib of each lobe; petals 5–7 cm long, yellow (possibly with a dark spot at base?), externally densely pubescent (except basally) with minute arachnoid hairs, the margins of the claws bearded; staminal column 22–25 mm long, apically 5-dentate, glabrous, the filaments 2–3 mm long arising along length of column, the anthers 1–1.5 mm long. Capsules subglobose, 1.5 cm long and in diameter, 5-locular, densely antrorsely pubescent, the hairs yellowish; seeds [immature] reniform, ca. 4 mm long, pubescent. Chromosome number unknown.

Phenology. Collected in flower in April.

Distribution. The Philippines (Luzon); in forest at low elevation; possibly Thailand (see specimen citation below).

Illustration. Borssum Waalkes (1966: 37, fig. 6b).

ADDITIONAL SPECIMENS EXAMINED. **Thailand.** Sitan, Loie, 300 m, *Dec 24* [3630] (US). This specimen is only tentatively included here.

Among the yellow-flowered species with cupuliform involucels, *T. crestaense* is distinguished by having leaves that are often oblong-elliptic and only shallowly (if at all) cordate and lacking a foliar nectary. The involucel (Fig. 2k) is in some respects intermediate between the cupuliform type and the type with distinct elements. Although the original description says a foliar nectary is present near the base of the midrib, a careful examination of the type specimens (K, NY) did not confirm its presence.

**7. *Talipariti dalbertisii*** (F. Mueller) Fryxell, comb. nov. *Hibiscus dalbertisii* F. Mueller, *Descr. Notes Papuan Pl.* 4: 56. 1876.—TYPE: NEW GUINEA. Fly River, *d'Albertis s.n.* (holotype: not located; isotypes, fide Borssum Waalkes, 1966: BM, FI, MEL).

*Hibiscus cardiostegius* Hochreutiner, *Annuaire Conserv. Jard. Bot. Genève* 20: 153. 1917.—TYPE: NEW GUINEA. [INDONESIA. West Irian:] Humboldt Bay, north coast, ca. 75 m, 2 Jan 1911, *Gjellerup 417* (holotype: not located; isotypes: BO, K, L!).

*Hibiscus fluminis-idenburgii* Borssum Waalkes, *Reinwardtia* 4(1): 53. f. 6. 1956.—TYPE: NEW GUINEA. [INDONESIA. West Irian:] Idenburg River, 1200 m, Feb 1939, *Brass 12978* (holotype: BO; isotypes: BM, GH!, L!).

Figs. 1d, 2q.

Trees (3–) 10–37 m tall, the twigs densely stellate-pubescent, the hairs mostly 1 mm long, yellowish. Leaf blades ovate, 5–17 cm long, 3–13.5 cm wide, smaller distally, basally cordate, the margin entire, apically acute, palmately 7-nerved, discolorous, the upper surface sparsely and minutely pubescent (especially on nerves), the lower surface sparsely to densely stellate-pubescent, the hairs 0.2 mm in diameter, foliar nectaries absent; petioles 3–6 cm long with pubescence like stem; stipules (Fig. 1d) 1–1.5 cm long, 1 cm wide, ovate-acute, sessile and amplexicaul, stellate-pubescent externally, minutely so internally, deciduous, leaving annular scars. Pedicels solitary in the leaf axils, 0.5–3 cm long, stout (2–3 mm in diameter), stellate-pubescent; involucellar bracts (Fig. 2q) 6, distinct, ovate-cordate (thus basally plicate), 15–30 mm long, 10–22 mm wide, stellate-pubescent; calyx (Fig. 2q) 3–4 cm long, densely and softly yellowish pubescent and with a few scattered, large stellate spicules, ca. half-divided, the lobes 2–2.5 cm long, the



margins plicate in bud, the midribs of the lobes with prominent nectaries (often concealed by the involucrel); petals 9–10 cm long, 2–3 cm wide, deep pink, externally pubescent, the hairs semi-lepidote, pubescence denser toward the base; staminal column nearly equaling the petals, more or less stellate-pubescent basally, filamentiferous distally, the filaments 4–8 mm long; styles emerging from the staminal column by ca. 5 mm, the stigmas capitate, asymmetrical, 2 mm in diameter. Capsules ovoid, ca. 4 cm long, 1.5–2 cm in diameter, 5-locular (“10-celled”), antrorsely strigose, the hairs ca. 3 mm long, yellowish; seeds numerous, reniform, 3–4 mm long, densely ferruginous-wooly. Chromosome number unknown.

**Phenology.** Flowering and fruiting more or less throughout the year.

**Distribution.** New Guinea, “the area between Mamberamo R., Idenburg R., North coast and the frontier between West and East New Guinea, also the area of the Digul R., Madang, Sepik, and the Fly R.” (Borssum Waalkes 1966: 41); in primary and secondary forest, often along river banks; near sea level to 1750 m; sometimes planted near villages.

**Illustrations.** Borssum Waalkes (1956: fig. 6; 1966: 40, fig. 7b).

**ADDITIONAL SPECIMENS EXAMINED.** **Indonesia.** WEST IRIAN: Hollandia and vicinity, 40 m, *Brass* 8912 (A, L); Idenburg River, 15 km SW of Bernhard Camp, 1750 m, *Brass & Versteegh* 11959 (K, L); 6 km SW of Bernhard Camp, 1100 m, *Brass & Versteegh* 12525 (A, K as photo, L); District Hollandia, Bodem River, 60 km SE of Sarmi, 75 m, *Iwanggin* 5895 (L); District Hollandia, near Kwansem bivouac, St. from Sidoarsi Mts., ca. 200 km W of Hollandia, *Iwanggin* 9024 (A, L); slope of Cycloops Mtns, Sukarnapura, 100 m, *Kostermans & Reksodihardjo* 69 (L); 05°38'33"S, 141°E, *Reksodihardjo* 526 (L-3); Okwalimkam River headwater, 1250 m, 05°2'S, 140°55'E, *Ridsdale & Galore* NGF-33153 (A, L); weg naar Hollandia-Binnen, 50 m, *Schrijn* 3594 (L-2); W of Hollandia, N of Simboro Strait of Sentani Lake, *Sigafoos* 12 (A); SW of Hollandia, Lake Plain of Sentani Lake and foothills of Cyclops Mtn, *Sigafoos* 115 (US); District Hollandia, road leading to Hamadi, 70 m, *van Royen* 4104 (A, L); Cycloop Mtns, along path to Ormoe, 380 m, *van Royen & Sleumer* 5639 (L); District Hollandia, Cycloop Mtns, road to Sentani, 320 m, *van Royen & Sleumer* 5655 (A, L-2); Cycloop Mtns, gully leading to Kota Nica, *van Royen & Sleumer* 5857 (A); District Hollandia, Cycloop Mtns, path Dozai-Dafonsero, N of Dozai, 1100 m, *van Royen & Sleumer* 6426 (A, L); along river Digoel, near Wage Div., 5 m, *Versteegh* 4856 (L). **Papua New Guinea.** CENTRAL: Subdistr. Rigo, near Oboha village, *Wiakabu & Giyowosa* 70443 (A, US).—EAST HIGHLANDS: Kainantu Subdistrict, top of Kassam Pass, 1700 m, 06°13'S, 146°4'E, *Streimann* NGF-47903 (L).—MADANG: Gogola Valley road, 30 mi from Madang, 60 m, 05°15'S, 145°35'E, *Womersley & Vink* NGF-12578 (L).—WESTERN: Kiunga Subdistrict, Ingembit, 05°38'S, 141°0'E, *Ridsdale et al.* NGF-31960 (A, K, L).—WEST SEPIK: Subdistrict Telefomin, near Busilmin airstrip on track to Telefomin Basin, 1500 m, 04°55'S, 141°8'E, *Barker* LAE-66835 (L); Leitre village, 10 m, 02°50'S, 141°35'E, *Sayers* NGF-18951 (L); Amanab Subdistrict, Imonda Patrol Post, 300 m, 03°20'S, 141°10'E, *Streimann & Martin* LAE-52870 (A, L); Telefomin Subdistrict, Bielga River below junction with Mogofogola River on Busilmin-Folongonom track, 1800 m, 05°00'S, 141°05'E, *Vinas* LAE-59573 (L).

*Talipariti dalbertisii* (Fig. 2q), *T. archboldianum* (Fig. 2r), and *T. schlechteri* (Fig. 4) are the only pink- or red-flowered species with a calyx 3 cm long or more and petals 9–10 cm long. Only *T. elatum* (with a yellow corolla) has flowers of comparable size (Fig. 2a).

“A highly decorative tree which might be introduced in horticulture” is noted on the collection label of *van Royen* 4104.

- 8. *Talipariti elatum*** (Swartz) Fryxell, comb. nov. *Hibiscus elatus* Swartz, Fl. Ind. Occid. 2: 1218. 1800. *Paritium elatum* (Swartz) G. Don, Gen. hist. 1: 485. 1831. *Hibiscus tiliaceus* var. *elatus* (Swartz) Hochreutiner, Annuaire Conserv. Jard. Bot. Genève 4: 63. 1900. *Hibiscus tiliaceus* subsp. *elatus* (Swartz) Borssum Waalkes, Blumea 14: 30. 1966.—TYPE: JAMAICA. *Swartz* s.n. (holotype: S!).



*Hibiscus azanzae* DC., Prodr. 1: 454. 1824. *Paritium azanzae* (DC.) G. Don, Gen. hist. 1: 485. 1831.—TYPE: Icones Florae Mexicanae s.n.! (Torner Collection Accession no. 6331.1423, Hunt Institute). Cf. copy at G, photo F-30498.

*Paritium elatum* var. *macrocarpum* Grisebach, Fl. Brit. W. Ind. Islds. 87. 1859.—TYPE: JAMAICA. 1858, *March 99* (lectotype, here designated: GOET!).

*Pariti grande* Britton in Small, Man. SE Fl. 859. 1933.—TYPE: U.S.A. Florida: Fort Myers, Edison Reservation, near dock, 2 Jul 1930, *Buswell s.n.* (lectotype, here designated: NY!).

Figs. 1c, 2a, b.

Trees 6–25 m tall, the trunks straight, up to 35 cm in diameter, the young stems minutely but obscurely puberulent. Leaf blades broadly ovate, 8.5–23 cm long, 6–30 cm wide, smaller and narrower distally, basally deeply to shallowly cordate (the sinus sometimes closed) or rounded in upper leaves, the margin entire or obscurely crenulate, apically short-acuminate, palmately or pedately 7 (–11)-nerved (the nerves raised beneath), discolorous, glabrous above, minutely puberulent beneath (hairs 0.1–0.2 mm long), with one or more obscure to prominent nectaries (3–5 mm long) at base of principal veins beneath; petioles 6–13 cm long, minutely puberulent; stipules (Fig. 1c) 3 cm long, 1.2–1.5 cm wide, oblong, acute, pubescent, sessile and amplexicaul, deciduous, leaving a prominent annular scar. Pedicels solitary in the upper axils, 1–3 cm long, stout (4–10 mm in diameter), minutely puberulent; involucre (Fig. 2a) cupuliform with 8–10 pointed teeth 4–5 mm long, the whole involucre 14–20 mm long, ca. half length of calyx, with acute or rounded sinuses, the teeth puberulent, the base glabrate, deciduous circumscissily (with the calyx) in fruit (Fig. 2b); calyx (Fig. 2a) (2.5–) 3–5 cm long, ca. half-divided, the lobes lanceolate, 2 cm long, 1 cm wide, densely yellowish puberulent, with an obscure nectary on the midrib of each lobe, deciduous circumscissily in fruit (Fig. 2b); petals 7–12 cm long, 1.5–4 cm wide, yellowish with red center, fading red-orange, externally with minute arachnoid hairs, internally glabrous, narrowly elliptic; staminal column (5–) 7–8 cm long, glabrous, pallid, filamentiferous in the distal 2/3, the filaments 2–5 mm long, the anthers and pollen yellow; styles emergent from the staminal column, sometimes exceeding the petals, pubescent, the stigmas purplish, obliquely capitate, 1.5–2 mm in diameter. Capsules ovoid, sometimes 5-angled, 2.5–4 cm long, 2.5 cm in diameter, 5-loculate (“10-celled”), densely hirsute, the hairs yellowish, appressed, 2–3 mm long; seeds numerous, 5 mm long, reniform, densely short-pubescent, the hairs 0.5 mm long or less. Chromosome number:  $2n = 90$  (Butorina et al. 1990).

Phenology. Flowering and fruiting throughout the year.

Distribution. Jamaica and Cuba, but introduced in other parts of the Caribbean (Kimber 1970; Little et al. 1974), Florida, Hawaii, and elsewhere (e.g., Little et al. 1974: 518; Marais & Friedmann 1987: 25).

Illustrations. Adams (1971: 15); Bates (1965: 72, fig. 2D); Kimber (1970: figs. 3–5); Little et al. (1974: 519, fig. 496); Meninger (1962: pl. 204\*, as *H. elatus*); Small (1933: 859, as *P. grande*).

ADDITIONAL SPECIMENS EXAMINED. U.S.A. FLORIDA: Dade Co., Bent Tree community, SW side of Miami, ornamental tree, *Nee 35058* (NY, TEX).—HAWAII: Oahu, Makiki Valley [cult.], *Degener 18217* (A, NY); Hawaii, from ridge between Waipi'o and Waimanu Valley, 23 Feb 1986, *Gon s.n.* (A, BISH, US); Kauai, Kapaa [introduced], *Little 31184* (US); HSPA Forest Nursery, Manoa Valley, *Yuncker 3567* (NY).



**Cuba.** CAMAGÜEY: vicinity of La Gloria, *Shafer 14* (NY-2).—CIENFUEGOS: Cieneguita, *Combs 672* (GH, NY, US); Soledad, *Gonzales 66* (A, NY), *Hodge & Howard 4009* (GH), *Jack 4072* (A), *Jack 4771* (A), *Jack 4705* (A), *Salvoza 538* (A), *Wright 2074* (GH).—ISLA DE LA JUVENTUD. Isle of Pines, Santa Fé, *Britton et al. 15115* (NY).—LA HABANA: San Antonio de los Barrios, *Baker 4680* (NY); Havana Botanic Garden, *Jack 4010* (A), May 1990, *Hernández s.n.* (NY); near Rincón, *Van Hermann 536* (MO, NY).—MATANZAS: 1 km E of Playa Larga, *Acevedo-Rodríguez et al. 6306* (NY); vic. of Matanzas, Valley of the Canimar, *Britton et al. 477* (NY).—ORIENTE: 20 km W of Compania de Moa mill, Sierra de Moa, *Howard 5972* (GH).—PINAR DEL RÍO: Sierra Rosario, 22°50'N, 83°0'W, 370–390 m, *Gentry et al. 71346* (MO).—SANTA CLARA: Trinidad Mountains, *Britton & Britton 5081* (NY); near San Blas, *Jack 7338* (NY), *Rehder 1162* (A); Lomas de Banao, *Bro. León 234* (NY).—SANTIAGO DE CUBA: vicinity of Baracoa, *Pollard et al. 73* (GH, NY). **Puerto Rico.** Caribbean National Forest, 18°00'N, 65°45'W, *Boom 7046* (NY, TEX); Caribbean National Forest, 18°17'N, 65°47'W, *Boom & Rivera 6806* (NY); Utuado, Bosque Ins. Río Abajo, *Little 14839* (GH, NY); Fajardo, planted on street, *Liogier et al. 32306* (NY); Río Piedras, street tree, *Liogier 35690* (BRIT, NY). Mpio. Cayey, just W of intersection of rtes. 184 and 179, 18°07'N, 66°03'W, *Miller & Taylor 6007* (MO); Mpio. Luquillo, El Verde Field Station, rte. 186 at the Río Sonadora, 18°20'N, 65°50'W, 350 m, *Taylor et al. 10898* (MO). **Haiti.** NORD-EST: Massif du Nord, sobre Morne Bois Pin, 19°34'N, 72°14'W, *Zanoni & Mejía 35808* (NY, TEX). **Dominican Republic.** PUERTO PLATA: 3.8 km al E de Imbert, 19°45'N, 70°47.5'W, *Zanoni & Pimentel 29220* (TEX).—SAN CRISTÓBAL: San Cristóbal en la calle [cult.], *Liogier & Liogier 20271* (NY).—SANTO DOMINGO: Trujillo University [cult.], *Jiménez 2772* (NY-2). **Jamaica.** CORNWALL: St. James Parish: near Flagstaff, *Lundell 16975* (LL, TEX). Trelawney Parish: Cockpit Country, Troy, *Britton 627* (NY); E side of Troy, *Gillis 8982* (A).—SURREY: Kingston Parish: Kingston, Mona Reservoir, in park, *Andrews 747* (NY); Phoenix Park, Moneague, *Fawcett & Harris 7046* (MO, NY); Kingston, *March 95* (GH), 8 Mar 1885, *Sargent s.n.* (A); Kingston, Hope Gardens, *Wetmore & Abbe 757* (A). Portland Parish: Blue Mountains, *Morley & Whitefoord 926* (A), *Judd 5493* (NY). St. Andrew Parish: near Richards reservoir, *Yuncker 17745* (NY). **Dominica.** St. Paul Parish, between Pont Casse and Pagua Valley, Central Forest Reserve (said to be planted by Forest Dept.), *Hill 22081* (TEX); St. Joseph Parish, D'Leau Gommier [cult.], *Nicolson 2015* (GH, NY, US); St. Paul Parish, Riversdale (below Cassé), *Nicolson 4060* (NY, US). **Martinique.** Introduit de l'île d'Haiti, *Duss 2023* (NY). **St. Lucia,** Barra d'Isle, *Cooley 8740* (GH), *Sturrock 411* (A); Edmund Forest, from plantation, *Slane 331* (A-2). **Guadeloupe.** Boivin, Abymes, *Stehlé 2036* (A). **Trinidad.** Port of Spain, Victoria Square, *Broadway 7* (A), *Broadway 6537* (MO).

**Colombia.** BOLÍVAR: Mpio. Cartagena, San Bernardo, Isla de Tintipán, 09°45'N, 76°04'W, Mar Caribe, *Callejas & Bornstein 11026* (LL). **Argentina.** CORRIENTES: Facultad de Agronomía y Veterinaria [cult.], *Krapovickas & Cristóbal 11351* (GH, LL, TEX, US).

*Talipariti elatum* is distinguished from other species of *Talipariti* in having a deciduous calyx and involucre, which falls with the corolla following anthesis, as is depicted in Fig. 2b. It also has larger flowers (calyx 3–5 cm long; petals 7–12 cm long, 2–4 cm wide) than most of the other species and is the only yellow-flowered species to have a calyx 3 cm long or more (Fig. 2a).

Kimber (1970) describes the economic uses of this species as a timber tree and its “incipient domestication.” It is sometimes planted in monoculture (Dominica: *Nicolson 2015*; St. Lucia: *Slane 311*) for timber harvesting.

Adams (1971, pp. 17 ff.) describes a case of introgression of Seaside Mahoe (*T. tiliaceum* var. *tiliaceum*) and Blue Mahoe (*T. elatum*) in St. Ann Parish, Jamaica, at an elevation intermediate between those of the two parental species, and the same phenomenon was noted by Kimber (1970). Such hybridization and/or introgression can occur where these species come into contact, but it seems to have little or no effect on the overall integrity of the two species, although it can pose problems in the identification of individual specimens from such hybrid-derived populations.

A lectotype is here chosen for the name *Pariti grande* Britton. A series of specimens, mostly collected by W. M. Buswell in 1930 in Fort Myers, exists in the NY herbarium together with several letters from Buswell to Small and some drawings by Buswell. These represent two or perhaps three species (or two species



and a hybrid) that were evidently the basis for the treatment of *Pariti* in Small's Flora. Four of these sheets clearly represent the basis for the name *P. grande*, although none of them is so annotated. One of them is here designated as lectotype and has been so labeled.

**9. *Talipariti ellipticifolium*** (Borssum Waalkes) Fryxell, comb. nov. *Hibiscus ellipticifolius* Borssum Waalkes, *Reinwardtia* 4(1): 55, fig. 7. 1956.—TYPE: PAPUA NEW GUINEA. East Sepik: Karosomeri River, *Womersley NGF-3689* (holotype: LAE; isotypes: A!, BM, BO, BRI, K as photo TEX!, L!, SING).

Fig. 2o.

Trees "slender and straight" 8–20 m tall, the twigs sparsely and minutely stellate-pubescent (the hairs ca. 0.5 mm long), glabrescent. Leaf blades broadly elliptic to ovate, 9–21 cm long, 5–15 cm wide, basally rounded to subtruncate (rarely somewhat cordate), the margin entire, apically short-acuminate, palmately 5–7-nerved, sparsely stellate-puberulent (especially on nerves) to glabrescent above, more densely puberulent beneath, the midrib abaxially with a nectary 5–11 mm long positioned ca. 1 cm above the leaf base; petioles 2.5–10.5 cm long, with pubescence like stem; stipules 7–12 mm long, 4–6 mm wide, ovate, acute, sessile and amplexicaul, minutely stellate-pubescent, deciduous. Pedicels solitary in the leaf axils, 1–2 cm long; involucellar bracts (Fig. 2o) 6, distinct, lanceolate, 10–12 mm long, 3–5 mm wide, narrowed at base, spreading or reflexed, minutely pubescent or glabrous; calyx (Fig. 2o) 2–3 cm long, externally scabrid with stiff stellate hairs 0.5–1 mm long (especially toward the base), internally with minute stellate hairs, ca. half-divided, the lobes triangular or ovate, 8–15 mm long, 5-nerved, with a prominent nectary on each midrib positioned relatively near the base; petals 7–8 cm long, 2–3.5 cm wide, bright pink or red, externally pubescent, the hairs semi-lepidote; staminal column 4–7 cm long, basally pubescent, distally filamentiferous, the filaments 4–8 mm long, anthers purple; styles emergent from the staminal column, glabrous, the stigmas capitate, greenish, 2 mm in diameter. Capsules ovoid, ca. 2 cm long, 1.5 cm in diameter, 5-loculate ("10-celled"), acute to acuminate, antrorsely hirsute, the hairs 2–3 mm long; seeds unknown. Chromosome number unknown.

Phenology. Collected in flower from May through August.

Distribution. Papua New Guinea (see map in Borssum Waalkes 1956: 42, fig. 1); in secondary forest; 10–100 m.

Illustration. Borssum Waalkes (1956: 56, fig. 7).

ADDITIONAL SPECIMENS EXAMINED. **Papua New Guinea.** EAST SEPIK: near Ambunti, 10 m, *Hoogland & Craven 10182* (US, L-2); Ambunti Subdistrict, near Wagu, 60 m, *Hoogland & Craven 10372* (K, L-2); Ambunti Subdistrict, along Yapa (Hunstein River), 120 m, *Hoogland & Craven 10613* (L-2); Angoram Subdistrict, Amboin, ca. 100 m, 04°40'S, 143°35'E, *Millar & Dockrill NGF-35169* (L); Angoram Subdistrict, Amboin, 50 m, 04°5'S, 144°5'E, *Millar NGF-37543* (L).—MADANG: N of Aiome station, 120 m, 05°07'S, 144°45'E, *Henty NGF-27448* (L); near Mawan village, Gogol Valley, 60 m, *Hoogland 4880* (K, L-2); road to Utu, 60 m, 05°15'S, 145°40'E, *Millar NGF-22653* (L); Madang Subdistrict, Gogol Forestry Station, 30 m, 05°10'S, 145°25'E, *Stevens & Stone LAE-54694* (K, L).

*Talipariti ellipticifolium* stands out for having a reflexed involucl of six distinct, lanceolate bracts, which reveals a calyx with five prominent nectaries (Fig. 2o). This species is noted by *Hoogland & Craven 10372* as a source of timber "used in house building." Takeuchi (2000) states that the bark "is used as wall panels in houses" (p. 57) and "is peeled in strips as a sleeping mat" (p. 59).



**10. *Talipariti glabrum*** (Matsumura) Fryxell, comb. nov. *Hibiscus glaber* Matsumura ex Nakai, Bot. Mag. Tokyo 28: 310. 1914. *Pariti glabrum* (Matsumura) Nakai, Fl. Sylvat. Koreana 21: 99. 1936.—TYPE: JAPAN. [Bonin Islands] “Ogasawarajima,” *Matsumura s.n.* (holotype: TI).

*Hibiscus glaber* var. *cordatus* Nakai, Bot. Mag. Tokyo 28: 310. 1914.—TYPE: JAPAN. Bonin Islands: in insula Chichisima, Asahiyama, 13 Aug 1905, *Hattori s.n.* (holotype: TI).

*Hibiscus boninensis* Nakai, Bot. Mag. Tokyo 28: 311. 1914. *Pariti boninense* (Nakai) Nakai, Fl. Sylvat. Koreana 21: 98. 1936.—TYPE: JAPAN. Bonin Islands: in insula Mukôshima, 5 Aug 1905, *Hattori s.n.* (holotype: TI; isotype: TI).

Figs. 1j, 2h.

Trees 4–7 m tall, the stems glabrous or nearly so. Leaf blades leathery, broadly ovate, 3–10 cm long, 2.5–10 cm wide, the distal leaves smaller and narrower (sometimes oblong), basally rounded or shallowly cordate, the margin entire, apically acute or short-acuminate, glabrous, palmately 3–5 (–7)-nerved (the nerves raised beneath), with a small (1.5–3 mm) but prominent nectary at base of midrib beneath; petioles 1–3 (–7) cm long, glabrous or with a few weak stellate hairs <1 mm long; stipules (Fig. 1j) 15–25 mm long, 5–7 mm wide, oblong, sessile and amplexicaul, entire, apically rounded, essentially glabrous but with a white margin made up of a dense line of minute whitish arachnoid hairs, deciduous, leaving arched annular scars surrounding each node. Pedicels solitary, axillary or subterminal, 1–2 cm long in flower, 5–7.5 cm long in fruit, distally stout (2 mm in diameter), glabrous; involucler (Fig. 2h) cupuliform, 8–10-toothed, obscurely but densely pubescent, the stellate hairs minute (< 0.1 mm long), the teeth 2–3 mm long, sinuses rounded, internally densely yellowish pubescent; calyx (Fig. 2h) 20–22 mm long, greatly exceeding involucler, deeply 5-parted, the lobes 1.5 cm long, 6 mm wide, lanceolate, weakly ribbed, densely and minutely pubescent (obscurely so externally, prominently so internally), the calyx nectaries present and obscure or vestigial; petals 3–3.5 cm long, ca. 2 cm wide, yellow (fading red) with maroon center, externally pubescent, internally glabrous, the margins of the claw densely pubescent; staminal column 1.2–1.3 cm long, pallid, glabrous, filamentiferous throughout, the filaments ca. 1 mm long, the anthers yellow; styles emerging from the androecium (but 1 cm shorter than the corolla), the stigmas clavate, densely villous, dark purple. Capsules ovoid, shorter than to slightly exceeding the calyx, 12–15 mm long and in diameter, 5-locular, apically acute or obtuse (rarely slightly retuse), densely villous, the hairs ca. 0.5 mm long, yellowish, appressed; seeds numerous, 4–5 mm long, densely pubescent, the hairs 0.5–1 mm long. Chromosome number unknown.

Phenology. Apparently flowering and fruiting throughout the year.

Distribution. Bonin Islands: Muko Jima, Chichi Jima, and Haha Jima (Hahasima); 0–600 m (“abundant sea level to Mt. tops” *Wilson 8264*). One specimen is known from Yap Island, of the Caroline Islands Group.

ADDITIONAL SPECIMENS EXAMINED. **Japan.** BONIN ISLANDS: mountain back of Omura, *Fosberg 31468* (NY, US), *31475* (CTES, OSH, TEX), *31479* (OSH, TEX), *31481* (OSH, TEX); bay shore N of Omura, *Fosberg 31494* (US); old radio station E of Yankeetown, *Fosberg 31505* (OSH, TEX); Isl. Chichijima, Seto-miharashidai, *Kanai & Ono 764275* (K, L, NY); Mikazukiyama, *Murata et al. 9* (A); between Kiyose and Tsurihama, *Murata et al. 60* (A); Sakiura, *Murata et al. 66* (A); Mikazukiyama-Okumura, *Sohma et al. 715020* (MO); Mt. Mikazuki, Ogasawara-mura, *Fujita & Shimizu 13* (BISH), *14* (L), *309* (A); Mt. Hoa, *Wilson 8239* (A, US); Chichijima, 3 May 1917, *Wilson s.n.* (A); Ogasawara Islands, Chichijima, above Tsurihama beach, *Woolliams & Tannowa 43* (PTBG); without precise



locality, 1853–1856, *Wright s.n.* (US); Shima-itibi, 28 Sep 1909, *s. coll. s.n.* (US). **Caroline Islands.** YAP ISLAND: Kanif, *Takamatsu 1935* (US).

**U.S.A. HAWAII.** Kauai, Lawai Valley, Pacific Tropical Botanical Garden [cult.], *Flynn 397* (PTBG), *Flynn 6327* (BISH, PTBG, TEX); Oahu, Waimea Arboretum [cult., ex Chichijima], *Simon 75P800* (BISH).

*Talipariti glabrum* is distinguished by its nearly glabrous foliage, its elongate (accrescent) fruiting pedicels, and by its distinctively white-margined stipules. It is closely allied to *T. hamabo*, both morphologically and geographically, although it does not achieve as northerly (temperate) a distribution as does the latter species.

According to Nakai (1936), *Hibiscus glaber* var. *cordatus*, also from Chichi Jima, differs in the cordate base of the leaf lamina. According to field notes (*Wilson s.n.*) the wood “is used by the Bonin Islanders for making the arms of canoes with which the outrigger is attached to the hull.”

The Yap Island specimen cited above conforms to *T. glabrum*, except that the stipules are not white-margined.

The collection listed as “*Hibiscus tiliaceus* var.  $\beta$ ?” by Hooker & Arnott (Bot. Beechey’s Voy. 259. 1838.) is *T. glabrum*.

**11. *Talipariti hamabo*** (Siebold & Zuccarini) Fryxell, comb. nov. *Hibiscus hamabo* Siebold & Zuccarini, Fl. Jap. 1: 176. 1841. *Hibiscus tiliaceus* var. *hamabo* (Siebold & Zuccarini) Maximowicz, Diagn. Pl. Nov. Asiat. no. 6, in Mélanges 12: 427. 1886. *Pariti hamabo* (Siebold & Zuccarini) Nakai, Fl. Sylvat. Koreana 21: 99. 1936.—TYPE: JAPAN. “ad littora Wagaraki,” *hb. von Siebold s.n.* (lectotype, here designated: “exemplar quod florae japonicae componendae inseririt,” L-908.135-840!; isolectotypes: K-herb. Hooker!, “exemplar authenticum hb. Siebold,” L-908.135-827!). Figs. 1i, 2g.

Trees or shrubs to 5 m tall, the young stems softly stellate-pubescent, the hairs 0.5 mm or less. Leaf blades broadly obovate, 5–7 cm long, 6–8 cm wide, basally cordate, the margin subentire or irregularly crenate or undulate, broadest above the middle, apically abruptly and shortly acuminate, pedately 5–7-nerved, discolorous, densely whitish puberulent beneath, the upper surface sparsely and minutely stellate-pubescent (the hairs 0.1–0.2 mm in diameter), with an elongate nectary (Fig. 1i) 2–4 mm long at base of midrib beneath (sometimes obscure or even absent); petioles 1–2.5 cm long, with pubescence like stem; stipules (Fig. 1i) oblong-ovate, 12–15 mm long, 6–8 mm wide, sessile and amplexicaul, softly stellate-pubescent externally, deciduous, leaving annular scars. Pedicels axillary and solitary or aggregated on short side branches in few-flowered inflorescences, 3–12 mm long, becoming stout (3–5 mm in diameter) in fruit; involucler (Fig. 2g) cupuliform, 8–10 mm long, minutely puberulent, 8–10-toothed, the teeth narrowly triangular, 4–5 mm long; calyx (Fig. 2g) ca. 2 cm long, more densely pubescent than involucler, half (or more) divided, the lobes 10–13 mm long, with a strong midrib, the nectary on the midrib obscure; petals 4–5 cm long, 3–5 cm wide, bright yellow with a dark red center, externally pubescent; staminal column 1.5–2 cm long, about half the length of petals or less, glabrous, filamentiferous in the distal 2/3, the filaments 1–1.5 mm long, the anthers yellow; styles emergent from the staminal column, purplish, the stigmas capitate, ca. 1 mm in diameter. Capsules ovoid, 2.5–3 cm long, 1.5–2 cm in diameter, 5-locular, acute to somewhat beaked, densely yellowish hirsute, the hairs antrorse, ca. 1 mm long; seeds reniform, 4.5 mm long, minutely papillate (seemingly glabrous). Chromosome number unknown.

Phenology. Collected in flower and fruit from July through November.



Distribution. Southern Japan and Korea; near seashores (Ohwi 1965), sometimes cultivated elsewhere.

Illustrations. Bates (1965: 72, fig. 2C), Siebold & Zuccarini (1841, loc. cit., pl. 93\*).

ADDITIONAL SPECIMENS EXAMINED. **China.** TAIWAN: Taipei, University Campus [cult.], *Huang* 2386 (MO). **India.** Hort. Bot. Calcuttensis [cult.], *s. coll. s.n.* (L). **Japan.** BONIN ISLANDS: without locality, 16 Sep 1908, *s. coll. s.n.* (US).—HONSHU: Nara Pref., Matsuyama, Ouda-machi, Uda-gun, *Makino* 71428 (L); Tenjimjima, Yokosuka, Prov. Sagami, Hondo, *Mizushima* 3068 (A).—KYUSHU: Pref. Kagoshima, Prov. Ohsumi, 20 May 1962, *Furuse s.n.* (A); Amakusa Island, Tomioka, 21 Aug 1935, *Kuenberg s.n.* (A); Nagasaki, 1863, *Maximowicz s.n.* (C, GH, K, L, NY, US-2); Tsushima Island, *Mimoro* 1764 (MO); Tsushima, S of Takeshiki, 34°17.5'N, 129°18'W, *Moran* 5573 (US); Nagasaki, *Oldham* 103 (GH, K, L).—RYUKYU ISLANDS: Amami-Oshimas, Uken-son, *Amano* 6443 (US); 21 Oct 1906, *Sakurai s.n.* (A); in ditione Mikasa Kori, prope vicum Faruda Tamaye, *s. coll.* 873 (L).—SHIKOKU: Isl. Shodo, Shodo-gun, Prov. Sanuki, *Satomi* 11334 (A). **Korea.** Hpalkai, *Taquet* 597 (K); without clear locality, *Taquet* 2698 (A), *Taquet* 4139 (A). **U.S.A.** HAWAII: Kauai: Koloa District, Lawai Valley, Natl. Trop. Bot. Gard. [cult.], *Flynn* 6325 (BISH, PTBG, TEX); Honolulu, Kapi'olani Park [cult.], *Lau* 1392 (BISH); Oahu, Haleiwa, Waimea Arboretum and Botanic Garden [cult.], *s. coll. s.n.* (NY, TEX).

The distinctive obovate leaf shape of *T. hamabo* sets it apart from its congeners and makes it readily recognizable. It is the most northerly species of the genus, occurring to at least 34°N latitude. As might be expected, it is also the most cold tolerant. It can be cultivated with impunity in temperate areas where it is regularly subjected to winter freezing temperatures, although there are presumably limits to how prolonged such exposure can be.

**12. *Talipariti hastatum*** (L. f.) Fryxell, comb nov. *Hibiscus hastatus* L. f., Suppl. Pl. 310. 1781. *Hibiscus tiliaceus* var. *hastatus* (L. f.) Hochreutiner, *Annuaire Conserv. Jard. Bot. Genève* 4: 63. 1900, nom. illegit. *Pariti hastatum* (L. f.) Degener & Greenwell in Degener, *Fl. Haw. Fam.* 221. 1957. *Hibiscus tiliaceus* subsp. *hastatus* (L. f.) Borssum Waalkes, *Blumea* 14: 36. 1966.—TYPE: Tahiti, *Forster s.n.* (holotype: LINN; probable isotypes, fide Borssum Waalkes 1966: BM, K, P).

*Hibiscus tricuspis* Banks ex Cavanilles, *Diss.* 3: 152. t.55. f.2. 1787. *Paritium tricuspis* (Banks ex Cavanilles) G. Don, *Gen. hist.* 1: 485. 1831.—TYPE: SOCIETY ISLANDS. Tahiti, *Forster ?142* (holotype: P).

*Hibiscus corrugatus* J. W. Moore, *Bull. Bishop Mus.*, Honolulu no. 102: 31. 1933.—TYPE: SOCIETY ISLANDS. Raiatea, near beach, 3.5 mi S of Uturoa, *Moore* 325 (holotype: BISH!; isotype: MO!).

Fig. 2e.

Trees 3–14 m tall, the young stem finely arachnoid-pubescent and with scattered stellate hairs to 0.5 mm long, or glabrescent. Leaf blades variable, narrowly lanceolate, ovate, or more or less 3-lobed (the central lobe the largest and sometimes secondarily lobed), the blade longer than broad (rarely as broad as long), 8–17 cm long, 2–12 cm wide, basally truncate or cuneate (rarely subcordate), the margin subentire or undulate-crenate, apically acute or acuminate (or the lateral lobes obtuse), pedately 7–9-nerved (the midrib separated from two more or less pedate lateral fascicles of nerves), minutely stellate-pubescent beneath, subglabrous above, sometimes with a prominent elongate nectary (6–8 mm long) on the midrib beneath, or foliar nectaries absent; petioles subequal to blades, to 16 cm long, more or less stellate-pubescent; stipules foliaceous, 3 cm long, 1–1.4 cm wide, lance-ovate, erect, sessile and amplexicaul, externally stellate-pubescent (hairs



ca. 0.5 mm long), deciduous, leaving annular scars. Flowers more or less aggregated at the ends of leafless branches, forming 3–6-flowered sympodia; pedicels 1–2 cm long, 3–4 mm thick in fruit; involucre (Fig. 2e) cupuliform, 8–10 mm long (about equaling the sinuses between the calyx lobes), minutely puberulent, ca. 10-toothed, the teeth 3–4 mm long; calyx (Fig. 2e) 2–2.8 cm long, more than half-divided, the lobes triangular, minutely pubescent, 1.5 cm long, 4–7 mm wide at base, with a small nectary on midrib of each lobe; petals 4–6 cm long, 3–4 cm wide, dark reddish, the blade yellow (fading orange or reddish), minutely stellate-pubescent, obovate or sometimes distally erose or deeply lacerate, the claws narrow; staminal column 2 cm long, glabrous, filamentiferous throughout length, the filaments 1–3 mm long; styles emergent from the staminal column, with dense short glandular (?) hairs, the stigmas obliquely capitate, ca. 1 mm in diameter. Capsules obovoid, 1.5 cm long, nearly equaling the calyx, 17–18 mm in diameter, 5-locular, densely and antrorsely hirsute, the hairs ferruginous, 0.5–1 mm long; seeds numerous, reniform, 4 mm long, obscurely and minutely scabridulous (seemingly glabrous). Chromosome number:  $2n = \text{ca. } 80$  (Youngman 1927; Longley 1933);  $2n = 120$  (Pushparajan et al. 1986).

**Phenology.** Flowering and fruiting throughout the year.

**Distribution.** Society Islands; on sandy seashores. Cultivated in tropical Asia (Masters in Hooker, 1872; Paul & Nayar, 1988; Wight & Arnott 1834), Hawaii, and elsewhere. Introduced to Hawaii from Tahiti by G. P. Wilder, according to *Wilder 34 (A)*.

**Illustrations.** Bates (1965: 72, fig. 2B); Borssum Waalkes (1966: 37, fig. 6); Cavanilles (1787: t. 55, f. 2).

**ADDITIONAL SPECIMENS EXAMINED.** **U.S.A.** FLORIDA: Miami, Fairchild Tropical Garden [cult.], *Houghton & White 1125 (MO)*.—HAWAII: Kauai: Koloa District, Lawai Valley, Natl. Trop. Bot. Gard. [cult.], *Chapin et al. 27 (PTBG, TEX)*, *Chapin et al. 20 (PTBG, TEX)*, *Chapin et al. 21 (PTBG, TEX)*, *Chapin et al. 24 (PTBG, TEX)*, *Flynn 6326 (BISH, PTBG, TEX)*. Maui: Maui Zoological and Botanical Garden, from Spreckelsville beach, *Davis & Sylva 11 (BISH)*. Molokai: beach at One Alii Park, *Pelalo 48 (BISH)*. Oahu: Honolulu, Girls School [cult.], *Grant 5610 (A, BISH)*, 25 Sep 1937, *Judd et al. s.n. (BISH)*; Honolulu, Kalihi, nursery of Bishop Estate [cult.], 12 Nov 1930, *Judd s.n. (BISH)*; Honolulu, Kawaiku'i Park [cult.], *Lau 1398 (BISH)*; Waimea Arboretum and Botanic Garden, accession no. 74p439 [cult., from Raiatea], *Lau 2814 (BISH)*; 1930 Ualakaa Street, Honolulu, [cult., from Tahiti], *Wilder 34 (A, BISH)*. **Trinidad.** Botanic Garden, *s. coll. 158 (US)*.

**India.** Hort. Bot. Calcuttensis, *s. d., s. coll. s.n. (GH)*.

**Fiji.** Viti Levu, Tholo North, vicinity of Tavua, *Degener 14967 (A, BISH, MO, NY, TEX, US)*; without locality, *Seemann 26 (GH)*. **Papua New Guinea.** NEW BRITAIN: Nodup area, *Waterhouse 307 (NY)*. **Society Islands.** BORABORA: Vaitape, in village near sea, *Fosberg 12169 (BISH)*; Dist. Tevaitapu, Popoti, *Grant 5051 (BISH)*.—MAUPITI: E coast, Maupiti village, *Fosberg 64931 (US)*.—MOOREA: Côte Est, Vaiare, bord de route près du débarcadère, *Florence 4712 (US)*.—RAIATEA: Baie d'Opoa, 16°50'S, 151°22'W, *Florence 3518 (US)*; Opoa, head of Opoa Bay, planted, growing in edge of water, *Fosberg & Sachét 63234 (BISH, MO)*, planted in rows of trees along road, *Fosberg & Sachét 63237 (BISH)*.—RAIVAVAE: Village de Rairura (147°40'W, 23°52'S), *Florence & Sykes 11189 (US)*.—TAHITI: Papeete, Parking de l'OTAC, *Florence 2377 (US)*; Dist. Hitiaa, beach, *Grant 4502 (A, BISH)*; Dist. Mataiea, *Grant 4556 (BISH)*; about 1 mi N of Papeete along shore, *MacDaniels 1697 (BISH, NY, TEX, US)*; Papeari, Domaine Motu-Ovini, *Maclet 34 (BISH)*; Papeete (Jardin de Mamao), *Maclet 56 (US)*; PIRAE (Service Agriculture), *Maclet 88 (US)*; Papeete, hedge in garden, *Sachét 1406 (US)*; near Papawa bridge, *Setchell & Parks 156 (BISH, GH, US)*; Jun 1792, *Smith & Wiles s.n. (NY)*; Papeete, seashore, *Wilder 506 (BISH)*.

The leaf form of *T. hastatum* is highly variable. It commonly has more or less 3-lobed leaves, although it sometimes has unlobed leaves, but then they are narrowly lanceolate rather than broadly ovate. Such leaf lobing is essentially unknown in other species of *Talipariti*. The petals of *T. hastatum* are also distinctive, in that they are



sometimes deeply laciniate (e.g., *Lau 2814*), though this feature, too, is variable in expression. The extended inflorescence (sympodium) is a characteristic that *T. hastatum* shares with *T. potteri*.

A collector's note (*Degener 14967*) says "fibers used in house-building," presumably in reference to bast fibers from the bark.

Borssum Waalkes (1966: 36) states that the holotype of *Hibiscus hastatus* came to be in the Linnean Herbarium at the Linnean Society by a circuitous route, but neither Jackson (1912) nor the IDC microfiche of the Linnean Herbarium indicate the presence of the specimen. Borssum Waalkes also notes that the holotype of *Hibiscus tricuspis* is in the general herbarium in Paris and not in Madrid. Garilleti (1993) verifies (by omission) its absence from Madrid.

**13. *Talipariti leeuwenii*** (Borssum Waalkes) Fryxell, comb. nov. *Hibiscus leeuwenii* Borssum Waalkes, *Reinwardtia* 4(1): 50, fig. 5. 1956.—TYPE: NEW GUINEA. [INDONESIA. West Irian:] Mamberamo River, Albatros Bivouac, 30 m, *Docters van Leeuwen 9113* (holotype: BO; isotypes: A! K, L-2!; photo of K isotype: TEX!).

Trees 15–20 m tall, the twigs stellate-pubescent, the hairs ca. 1 mm long. Leaf blades broadly ovate, 6–16 cm long, slightly wider, basally cordate, the margins entire, apically acute, palmately 7-nerved, somewhat discoloured, both surfaces stellate-pubescent, the hairs ca. 0.5 mm in diameter, with a single foliar nectary 4–10 mm long at base of blade; petioles 3–9 cm long, with pubescence like stem; stipules ca. 1 cm long, 0.5 cm wide, stellate-pubescent, sessile and amplexicaul, deciduous, leaving annular scars. Pedicels solitary in the leaf axils, 1–4 cm long, stellate-pubescent; involucellar bracts 6, distinct, cordate-ovate (thus basally plicate), 2.5–3 cm long, 1.5–2 cm wide, acute, sparsely and obscurely pubescent; calyx 2.5–3 cm long (subequal to involucl), densely and minutely stellate-pubescent, more than half-divided, nectaries absent; petals [not seen] "lilac" or "red." Capsules narrowly ovoid, 3 cm long, 1 cm in diameter, 5-angular, acuminate, hirsute with long simple appressed hairs and with minute stellate hairs, "10-ocular" [ex descr.], minutely pilose internally; seeds numerous, reniform (distinctly curved), densely pilose, the hairs stellate, ferruginous. Chromosome number unknown.

Phenology. Collected in flower in March, May, and October.

Distribution. New Guinea (see map in Borssum Waalkes 1956: 42, fig. 1); in primary forest at 30 m elevation.

Illustration: Borssum Waalkes (1956: 51, fig. 5).

ADDITIONAL SPECIMEN EXAMINED. **Indonesia.** WEST IRIAN: Mamberamo River, Pioneers Bivouac, 30 m, *Van Eechoud 44* (=bb.31108) (L).

*Talipariti leeuwenii* is distinguished by a combination of characters, as is indicated in the key to species.

**14. *Talipariti macrophyllum*** (Roxburgh ex Hornemann) Fryxell, comb. nov. *Hibiscus macrophyllum* Roxburgh ex Hornemann, *Hort. Bot. Hafn. Suppl.* 149. 1819. *Paritium macrophyllum* (Roxburgh ex Hornemann) G. Don, *Gen. hist.* 1: 485. 1831.—TYPE: Botanic Garden, Calcutta from Chittagong?, *Wallich s.n.* (lectotype, here designated: C!, the sheet labeled "1b"; isotypes: C!, 6 additional sheets).



*Hibiscus setosus* Roxburgh, Fl. Ind. 3: 194. 1832.—TYPE: Botanic Garden Calcutta, *Roxburgh s.n.* (lectotype, designated by Borssum Waalkes, 1966: BR-herb. Martius).

Figs. 1a, 2c.

Trees 15–25 m tall (sometimes smaller and shrubby), the young stems densely shaggy-hirsute with yellowish stellate hairs to 5–8 mm long simulating simple hairs, and with an understory of smaller stellate hairs. Leaf blades broadly ovate, 5–40 cm long, 4.5–50 cm wide, basally deeply cordate, the margin crenulate to subentire, apically abruptly acuminate, palmately 7–9-nerved, discolorous, coarsely tomentose, more densely so and yellowish beneath, with a nectary on each principal vein beneath positioned 1/3–2/3 the distance from base to apex, the nectary often obscured by pubescence; petioles 17–35 cm long, with pubescence like stem (especially basally); stipules (Fig. 1a) 3–11 cm long, 1.5–3 cm wide, ovate to scimitar-shaped, sessile and amplexicaul, hirsute (especially externally), deciduous, leaving annular scars. Pedicels axillary, solitary (or sometimes in 2-flowered sympodia), presented horizontally, 1 (–5) cm long, densely hirsute, the subtending leaves reduced to 6–8 cm long; involucl (Fig. 2c) ca. 2.5 cm long, the 8–10 elements nearly distinct, lanceolate or ligulate, ca. 3 mm wide, yellowish hirsute; calyx 2.5–3 cm long, slightly exceeding the involucl, more than half-divided, the 5 lobes each 3-nerved, less densely hirsute than involucl, nectaries absent; petals 4–6 cm long, 2–4 cm wide, yellow with dark red basal spot (fading purplish), glabrous within, externally hirsutulous; staminal column 3–4 cm long, glabrous (?), yellowish, filamentiferous throughout, the filaments 2–8 mm long; anthers yellow, 1.5 mm long; style exceeding staminal column by ca. 8 mm, dividing into 5 purplish red and pilose branches, the stigmas 1.5 mm wide (apparently clavate), minutely pilose. Capsules erect, obovoid, 2.5–3.5 cm long, 18–20 mm in diameter, 5-locular, apiculate or beaked, shaggy-hirsute; seeds numerous, reniform, 4 mm long, with 3 mm ferruginous hairs along edges. Chromosome number unknown.

Phenology. Flowering and fruiting throughout the year.

Distribution. India and the Malay peninsula to Java, the Philippines, and southern China; in secondary forests from the lowlands up to 1400 m, never along the coast. Cultivated and naturalized in Hawaii and perhaps elsewhere. See map in Phuphathanophonong et al. (1989: fig. 11) for distribution in Thailand.

Illustrations. Bates (1965: 72, fig. 2E); Degener (1932: fam. 221), Feng (1984: 16, fig. 1); Hu (1955: pl. 19, fig. 7); Phuphathanophonong et al. (1989: fig. 10); Wallich (1830, vol. 1: 44. t. 51).

ADDITIONAL SPECIMENS EXAMINED. **Bangladesh.** Chittagong Hill Tracts, Mainimukh on the northern side, *Huq 3184* (L); Chittagong Hill Tracts, Kasalong, *Lister 44* (L). **China.** YUNNAN: FO-HAI, *Wang 74628* (A); without locality, *Wang 77660* (A). **India.** ASSAM: Naga Hills, Nambor Forest, *Bor 18538* (L); without locality, *Griffith 477* (C, GH, K, L), *Masters s.n.* (L).—NAGALAND: Dinapur Forest, along railroad track, *Srivastava et al. 91664* (MO).—Without locality: "Ind. or." *Wallich 1905* (L); Hort. Bot. Calcuttensis, *s. coll. s.n.* (L). **Indonesia.** JAVA. Res. Batavia, Warrajas, 630 m, *Bakhuizen van den Brink 4886* (L); Res. Madioen, Oostbank boven Plaosan, 1000–1200 m, *Elbert 188* (L-2); Res. Bantam, Kuala Hills, *Forbes 531* (K); Mt. Salak, cascade du Tjisahat, rochers de la cascade, 620 m, *Hochreutiner 1251* (L); Palabuanratu, *Koorders 4575* (K); Distr. Tjisondari, Tjigenteng [cult.], *Koorders 4577* (L); Mt. Karang, Kp. Monggos, 1000 m, *Koorders 4578* (L); Distr. Batuhideung, Mt. Pangisisan, *Koorders 4579* (L); Pekalongan: Sirundo (Tjomal), coffee estate Pretigan, *Koorders 11533* (L); Res. Preangu, Palabuanratu, *Koorders 11779* (L); Res. Pekalongan, Subah, *Koorders 14222* (L); southern mountains, Suberlandjing near Kalipare, *Koorders 23451* (L); Res. Bogor, Mt. Salak, Kp. Bumaga, 600 m, *Koorders 24283* (L); Preanger, Pengalengan, 1400 m, *Wind P7* (L); without locality, *Zollinger 1433* (A, L-2); *Blume s.n.* (NY); *Koorders 13553* (K, L).—SUMATRA. Deli-Atjeh border, edge of



mangrove swamp, *Bangham & Bangham 651* (A, NY); Asahan, East Coast, *Bartlett & La Rue 209* (GH, L). **Laos.** Vientiane, colline au nord de la digue du réservoir Nam Ngum, *Vidal 5936* (US). **Malaysia.** KELANTAN: Ulu Kelantan, Sunbgei Ketil, Gua Musang, *Shah & Ali 2853* (C); Ulu Kelantan, Galas FR, E of Gua Batu Boh, Gua Musang, *Shing FRI 19272* (A, K).—PAHANG: Maran/Temerloh Road by Sg. Kemak Bridge No. 54/5, *Burkill 2698* (L-2); Sungai Estates, *Kadim & Mahmood 105* (L).—PERAK: Gunong Bubu, *Whitmore FRI 0972* (A, L). —SELANGOR: Ulu Muda For. Res., North Kedah, *Bray 11784* (L), *Chan 6739* (K, L); Ulu Gombak, *Stone 6662* (BISH, L).—TRENGGANU: Ulu Telemong, Bukit Rambai FR., *Suppiah 11389* (L).—SABAH: Distr. Ranau, Poring Hot Springs at SE base of Mt. Kinabalu, 6°3'N, 116°42'W, *Beaman et al. 7565* (L, MSC); Kinabalu National Park, en route from Poring Hot Springs and Langanan Waterfall, 600–900 m, *Kokawa & Hotta 4745* (L); Distr. Ranau, ca. 1 mi N of Kampung Pinawantai, 1600 ft, *Shea & Aban 76971* (A, L); Distr. Kota Belud, S of Sungei Mentenau, 1000 ft, *Shea & Minjulu 76302* (L). **The Philippines.** PALAWAN: Baraki, *Fox 13441* (L); Butaraza, Rio Tuba, at western plains of Bulanjao Range, *Soejarto & Madulid 8990* (A); Iraan Mountains, Aborlan, 200 m, *Sulit 12520* (A, L). **Singapore.** Hort. Bot., 9 Jun 1904, *Hallier s.n.* (A, L), Sargent, 28 Oct 1903, *Sargent s.n.* (A-2). **Thailand.** Prachinburi, Sriracha forest, *Collins 343* (US), *Collins 796* (K, US), *Collins 1136* (C, K, US); Satun Province, Tarutao Island, *Congdon & Hamilton 285* (A); between Krabi and Phang Nga., *Floto 779* (C-2, K, L); Nan, Doi Tiu, 500 m, *Kerr 5033* (K-2); Songkla Wang Yai, *Kerr 14772* (C-2, K-2); Chaburi Prov., Siricha Distr., Kew Kieo, 150 m, *Maxwell 75-46* (L); Prov. Kanchanaburi, Distr. Sangklaburi, Toong Yai Naresuan Wildlife Reserve, *Maxwell 94-538* (A); N Rachasima Natl. Park, *Phengkhlai 622* (C, K, L); Peninsular: Narathiwat, Waeng, *Phusomsaeng 371* (C, K, L); Kanchanaburi, Southwestern Distr., Khao Yai, E of Sangkhala, *van Beusekom & Phengkhalai 288* (C, K, L-2). **Vietnam.** Env. de Biên Hoa, Jun 1909, *d'Alleizette s.n.* (L); Prov. Biên hoa, *Pierre 1109* (A-2, BISH-3, C, K, L-9, MO, NY, P, US). **U.S.A.** HAWAII: Oahu, Honolulu, Degener garden [cult.], *Degener 9995* (BISH, BRIT, NY, TEX), *Degener 10331* (BISH, BRIT, GH, L, MO, NY); Oahu, Palama Valley, 1200 ft, (introduced from Samoa), 17 Jun 1936, *Judd s.n.* (BISH, NY); Hau'ula, Papali Gulch, 15 Jun 1989, *Miller s.n.* (BISH); Lyon Arboretum, Middle-Lawn Makai, *Teraoka 149* (BISH-2); Hauula Valley, completely naturalized in wet forest, *Topping 3151* (NY); HSPA Forest Nursery, Manoa Valley, *Yuncker 3565* (NY).

This is perhaps the most distinctive species of the genus and is set apart by a number of characters. Its remarkable pubescence is perhaps the most notable feature, with prominent yellowish hairs 5–8 mm long on the herbage generally. In addition, it has very large stipules (Fig. 1a), distally placed foliar nectaries on relatively large leaves, obovoid capsules, and seeds with the long seed hairs confined to the edges of the seed.

*Talipariti macrophyllum* is sometimes grown in cultivation and is reportedly used as a source of cordage (*Fox 13441*). A collector's note (*Judd s.n.*) says "Bark used in Samoa for *easina* (Woolly lavalavas)."

**15. *Talipariti pleijtei*** (Borssum Waalkes) Fryxell, comb. nov. *Hibiscus pleijtei* Borssum Waalkes, *Reinwardtia* 4(1): 46. 1956.—TYPE: NEW GUINEA [INDONESIA. West Irian:] Kadamak, vicinity of Sorong, 50 m, 11 Aug 1948, *Pleijte 510* (holotype: BO; isotypes: A!, BRI, K, L!, P, PNH, SING).

Fig. 1e.

Trees 13–25 m tall, the trunk buttressed, the twigs angular (ultimately terete), densely and very minutely puberulent or with fimbriate scales, becoming glabrescent. Leaf blades coriaceous, ovate, 7–20 cm long, 4.5–14 cm wide, basally rounded or subcordate, the margin entire, apically short-acuminate, palmately 5-nerved, with scattered minute stellate hairs or fimbriate scales except more densely pubescent on nerves beneath, with a small to elongated nectary (2–10 mm long) 5–10 mm above the base of the blade on midrib beneath; petioles 1–5 cm long, minutely stellate-pubescent or glabrous; stipules (Fig. 1e) 10–25 mm long, 5–18 mm wide, oblong to subrotund, appressed, apically obtuse or acute, with scattered minute pubescence. Flowers solitary in the leaf axils or in terminal 2–10-flowered sympodia,



or these combined into complex inflorescences; pedicels 1.5–2 cm long; involuellar bracts 5–6, briefly connate at base, ovate to lanceolate (sometimes revolute?), acute, 8–12 mm long, 3–8 mm wide (or wider), internally minutely pilose, externally with scattered stellate hairs or scales; calyx 12–16 mm long, ca. half-divided, the lobes ovate, acute, externally lepidote, internally minutely stellate-pubescent, ecostate, nectaries absent; petals 2.5–3 (–5?) cm long, 0.5–1 cm wide, red to purple, oblong or ligulate, externally densely lepidote; staminal column 1.5–2 cm long (rarely to 5 cm), densely lanate at base together with base of petals forming a cushion, otherwise glabrous, filamentiferous distally, red to purple, the filaments ca. 2 mm long; styles emergent from the staminal column, distinct for ca. 3 mm, the stigmas capitellate, ca. 1 mm in diameter. Capsules ovoid, 1.5–2 cm long, 1–1.5 cm in diameter, slightly pentangular, acute, externally minutely lepidote, internally densely woolly, “10-ocular” [ex descr.]; seeds numerous, reniform, 2.5 mm long, densely pubescent, the hairs ferruginous. Chromosome number unknown.

Phenology. Probably flowering and fruiting throughout the year.

Distribution. New Guinea (Vogelkop Peninsula and adjacent islands); mostly at low elevation in primary and secondary forest but once found (fide Borssum Waalkes, 1966) at 1400 m.

Illustration: Borssum Waalkes (1956: 47, fig. 3).

ADDITIONAL SPECIMENS EXAMINED. **Indonesia.** WEST IRIAN: Div. West New Guinea, Wersar (ca. 6 km S of Teminaboean), 10 m, *Kalkman 6310* (K); W. New Guinea, Kaloal, Eiland Salawati, 3 m, *Koster 1498* (L); Warsamson River, ca. 25 km E of Sorong, ca. 60 m, *Schram 5965* (L); Warsamson-vlakte, Sorong, *Schram 12330, 12383* (L); Vogelkop Peninsula, Sorong, 400 m, *van Royen 3080* (K); Waigeo Island, N of Sorong, 10 m, *van Royen 5516* (L).

*Talipariti pleijtei* and *T. sepikensis* are very similar, sharing the characters of relatively small flowers (calyx 1.2–1.6 cm long; petals pink or red) with lanate staminal columns, which set them apart from the remaining species. They are distinguished from each other by the characters given in the key.

- 16. *Talipariti potteri*** (O. Degener & Greenwell) Fryxell, stat. et comb. nov. *Pariti tiliaceum* var. *potteri* O. Degener & Greenwell, Fl. Haw. fam. 221. 1956. *Hibiscus tiliaceus* var. *potteri* (O. Degener & Greenwell) St. John, Mem. Pacific Trop. Bot. Gard. 1: 230. 1973.—TYPE: U.S.A. Hawaii: cultivated; seeds said to have come from Guadalcanal, Solomon Islands, *Degener & Degener 23758* (holotype: not located; isotypes: BISH! US!). Fig. 2j.

Trees to 10 m tall, the young stems minutely stellate-puberulent, the trunks erect (“not straggly [as in *T. tiliaceum*]”). Leaf blades broadly ovate, 8–17 cm long, 6–22 cm wide, basally deeply cordate (the sinus 2–5 cm deep), the margin entire, apically acute or subobtuse, pedately 9 (–11)-nerved, discolorous, the upper surface subglabrous, the lower surface minutely puberulent (soft to the touch), the hairs stellate, whitish, 0.2 mm in diameter; nectaries 3 (–5), elongated, 9–19 mm long, on the principal nerves near base beneath; petioles 2–12 cm long, with pubescence like stem; stipules [not seen] deciduous, leaving curved annular scars. Flowers borne on extended sympodia (with much-reduced leaves), up to 35 cm long with 4–9 flowers each, the sympodia sometimes aggregated distally into a complex inflorescence; pedicels 2–3.5 cm long, curved (ascending from a declined rhachis?), stout (3–5 mm in diameter); involucler (Fig. 2j) cupuliform, 8–10-toothed, basally ribbed (at juncture with pedicel), the teeth subequal to the sinuses of



calyx, triangular, 2–4 mm long, more or less reflexed in fruit; calyx (Fig. 2j) 18–20 mm long, deeply divided, minutely puberulent, each lobe ca. 1.5 cm long, with a prominent midrib and a (sometimes obscure or vestigial) nectary on midrib near center of each lobe; petals 3–6 cm long, 3–5 cm wide, yellow with maroon center, externally densely pubescent, internally glabrous; staminal column ca. 2 cm long, glabrous, filamentiferous throughout, the filaments 1–2 mm long; styles exceeding the staminal column by ca. 1 cm, pubescent, the stigmas capitate. Capsules (Fig. 2j) subglobose, short-beaked, slightly shorter than to subequal to calyx, 1.5 cm long, 1.5–2 cm in diameter, 5-locular (with papery internal dissepiments), densely pubescent, the hairs stellate, yellowish, 0.5 mm long or less; seeds numerous, dark brown, reniform, 4.5–5 mm long, appearing glabrous but minutely papillate. Chromosome number unknown.

Phenology. Collected in flower and fruit in February and from September through October, but the pattern is unclear.

ADDITIONAL SPECIMENS EXAMINED. **Caroline Islands.** Kosrae: Utwe District, coastal road from Utwe to Walag, 1–3 km W of Utwe, *Lorence et al.* 7868 (PTBG). **U.S.A. HAWAII.** Oahu, Mokuleia Beach, Waialua, planted in Degener garden (from type tree), 15 Oct 1957, *Degener & Degener* 24352 (L, US).

According to Degener and Greenwell (1956), *T. potteri* was “Cultivated for curiosity mainly in the arboretum of the Hawaiian Sugar Planters’ Association in upper Manoa Valley, Oahu, and in Foster Botanical Gardens, Honolulu, of which M. Colin Potter is custodian. The seed was brought originally from Guadalcanal by an unknown member of one of the armed services during the Second World War.” During this study no additional material has come to light from Guadalcanal that conforms to this plant, although a recent collection from the Caroline Islands is interpreted as conspecific. *Talipariti potteri* is considered distinctive enough in several characters, most notably its extended sympodial inflorescences, reflexed involucl, and papillate seeds to be recognized at specific rank. The sympodial inflorescences may also be found in *T. hastatum*, *T. pleijtei*, *T. pseudotiliaceum*, *T. sepikensis*, usually in a reduced form, and to a much-reduced extent in *T. tortuosum* and *T. macrophyllum*, but then only 2-flowered. Only in *T. hastatum* and *T. pleijtei* are the sympodia as fully developed as in *T. potteri*, but in these species other characters amply distinguish them.

**17. *Talipariti pseudotiliaceum*** (Borssum Waalkes) Fryxell, comb. nov. *Hibiscus pseudotiliaceus* Borssum Waalkes, *Reinwardtia* 4(1): 65, fig. 12. 1956.—  
TYPE: MOLUCCAS. [INDONESIA. Maluku:] Morotai, Tobelo, northern Tjao, 60 m, 2 Jul 1949, *Tangkilianian (Exp. Kostermans)* 229 = *bb.* 33899 (holotype: BO-116796; isotypes: BO, BZF, K! L! SING). Fig. 2n.

Trees to 22 m tall, the twigs minutely and sparsely stellate-pubescent, perhaps eventually glabrescent. Leaf blades broadly ovate or suborbicular, up to 18 cm long, 20 cm wide, basally deeply cordate (the sinus 2–3 cm deep), the margin entire or minutely denticulate, apically subobtusate to short-acuminate, palmately 7–9-nerved, discolourous, sparsely stellate-pubescent above, densely stellate-pubescent beneath (the hairs ca. 1 mm in diameter), foliar nectaries absent; petioles 5–12 cm long, with pubescence like that of the stem but denser; stipules 2–3 cm long, 1 cm wide, more or less elliptic to oblong, acute, externally stellate-pubescent, internally glabrous, eventually deciduous, the scars annular. Pedicels solitary in



the leaf axils (or in few-flowered axillary racemes?), 1–1.5 cm long, stout (3–4 mm in diameter), densely stellate-pubescent; involucellar bracts (Fig. 2n) 5–7, nearly distinct, 2–2.5 cm long (subequal to calyx), 8–12 mm wide, lanceolate to ovate, stellate-pubescent; calyx 2–3 cm long, densely stellate-pubescent, more than half-divided, each lobe prominently 3-ribbed, nectaries absent; petals 5 cm long [ex descr.], yellow; staminal tube and styles not seen. Capsules ovoid with a small beak, 1.5–2 cm long, 2 cm in diameter, 5-locular, densely yellowish pubescent; seeds numerous, reniform, 4 mm long, papillate. Chromosome number unknown.

Illustration: Borssum Waalkes (1956, fig. 12).

*Talipariti pseudotiliaceum* is the only species with few (5–8) involucellar bracts that has a yellow corolla. It is known only from the type, collected in primary forest.

Borssum Waalkes (1956, 1966) included this species in a broadly conceived *Hibiscus* sect. *Azanae*, but considered it more closely allied to *H. dalbertisii* than to *H. tiliaceus*. He used the epithet “pseudotiliaceus” in reference to the strong similarity of the stipules of his new species to those of *H. tiliaceus*.

- 18. *Talipariti schlechteri*** (Lauterbach) Fryxell, comb. nov. *Hibiscus schlechteri* Lauterbach, Nachtr. Fl. Deutsch. Schutzgeb. Südsee 316. 1905.—TYPE: “Neu-Mecklenburg: in den Gebirgswäldern bei Punam,” *Schlechter 14658* (holotype: B, destroyed).—PAPUA NEW GUINEA. West New Britain: Pulie River, about 10 mi from mouth, east side, Kandrian Subdist., 06°04'S, 149°12'E, 100 ft, 15 Mar 1966, *Henty & Frodin NGF-27205* (neotype, here designated: NY-2!). Fig. 4.

Trees ca. 12 m tall, the young stems with minute stellate hairs (0.5–1 mm in diameter), these quickly lost leaving obscure lepidote scales (less than 0.5 mm in diameter). Leaf blades broadly ovate, 15–25 cm long, 16–33 cm wide, basally rounded to deeply cordate, the margin entire to obscurely crenulate, apically subobtuse to acute or short-acuminate, palmately 7–9-nerved, discolorous, sparsely pubescent with minute stellate hairs (0.5–1 mm in diameter) or lepidote scales (0.3 mm in diameter) on both surfaces; with an elongate nectary, 9–18 mm long, near the base of the midrib beneath; petioles 6–17 cm long, with pubescence like stem; stipules 2.5–3 cm long, 1–1.5 cm wide, broadly ovate-sessile, basally auriculate, acute, densely stellate-pubescent externally, deciduous, leaving annular scars. Pedicels solitary in the leaf axils, 10–14 cm long, minutely and obscurely lepidote (like stem), 3–7 mm in diameter (increasing distally); involucellar bracts 5–7, these ovate with a narrowed base, ca. 3 cm long, 1–2 cm wide (somewhat unequal in size), sparsely lepidote, entire, acute, degree of distinctness unknown; calyx 5–5.5 cm long, densely lepidote, deeply divided, more or less ecostate, nectaries evidently absent; corolla [not seen] “bright red, slightly contorted/whorled with pale centre; underside of petals with brown scales”; staminal column and styles not seen. Capsules 4–4.5 cm long, 5-locular, dehiscent, externally lepidote and/or stellate-pubescent (the available specimens badly weathered); seeds (not seen) described as “densely brown-pilose.”

Distribution. Known only from the island of New Britain, Papua New Guinea.

ADDITIONAL SPECIMENS EXAMINED. **Papua New Guinea.** West New Britain: Kandrian Subdistrict, Alimbit River, 06°05'S, 149°35'E, standing at water's edge in fresh water reach of river, 8 Oct 1965, *Gillison NGF-22479* (K).—South New Britain: near Urin, 05°43'S, 149°05'E, 50 ft, *White NGF-10011* (CANB).



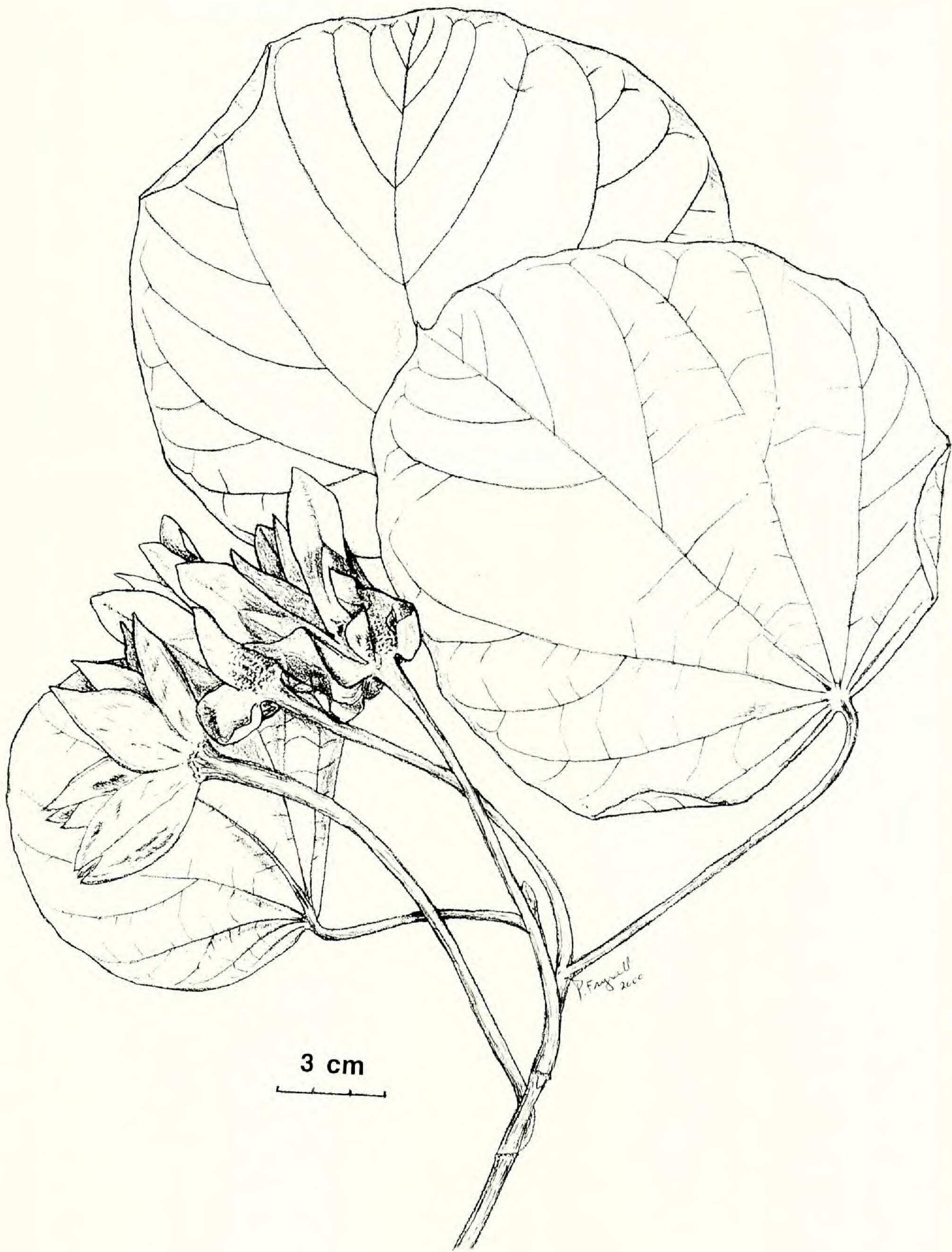


FIG. 4. *Talipariti schlechteri*. Fruiting branch (Gillison NGF-22479).

This species stands out for its very large calyces and fruits and for its elongated pedicels, especially in a genus otherwise characterized by relatively short pedicels (with the additional exception of *T. glabrum*). The red flowers, described by Borssum Waalkes (1966) as “in sicco dark red, in vivo yellow” (a description apparently taken from the protologue), lepidote pubescence, and the nature of



the involucler indicate an alliance with *T. archboldianum*, and indeed Borssum Waalkes (1966) kept *T. schlechteri* only provisionally distinct from this species; however, it may be distinguished from *T. archboldianum* by its larger leaves, stipules, pedicels, and fruits, and by the presence of a large foliar nectary. The auriculate stipules and very long pedicels appear to be unique features of *T. schlechteri*. The collections studied differ slightly in pubescence; the *Gillison* specimen is covered with minute lepidote scales and the *Henty & Frodin* specimen by minute stellate pubescence. In spite of this slight difference they are deemed to be conspecific.

The holotype was kept at the Berlin herbarium and was destroyed. No isotypes were indicated to exist by Borssum Waalkes (1966), whose study of the Malesian Malvaceae kept in European herbaria was very thorough. It is presumed, therefore, that no isotypes exist, and that the designation of a neotype is appropriate. The *Henty & Frodin* specimen (NGF-22479) is selected, because it agrees with the protologue in pubescence type.

The elongated pedicels are so unusual that they invite comparison with those of several species of the genus *Wercklea*, notably *W. woodsonii* (A. Robyns) Fryxell (Fryxell 1981, figs. 27 and 28); this similarity is further discussed above under "Generic Affinities."

**19. *Talipariti sepikense*** (Borssum Waalkes) Fryxell, comb. nov. *Hibiscus sepikensis*  
 Borssum Waalkes, *Blumea* 14: 46. 1966.—TYPE: PAPUA NEW GUINEA: [West] Sepik District, *Darbyshire & Hoogland* 8234 (holotype: L!; isotypes: A! K!). Figs. 1g, 2l.

Trees 15–19 m tall, the twigs terete, minutely lepidote becoming glabrescent. Leaf blades coriaceous, ovate, elliptic, or subobovate, 6–18 cm long, 4.5–11.5 cm wide, basally rounded to cordate, the margin entire, apically short-acuminate, palmately 5-nerved, minutely lepidote above and beneath, the midrib beneath with an elliptic nectary near the base; petioles 1.5–8 cm long, minutely lepidote; stipules (Fig. 1g) 7–10 mm long, 5 mm wide, broadly ovate, acute, appressed to the stem to spreading, deciduous (sometimes tardily so). Flowers in few-flowered sympodia in the upper axils; pedicels 1.5–2 cm long at anthesis, accrescent to 2.5 cm in fruit, minutely lepidote, sulcate when dried; involucellar bracts (Fig. 2l) 5, nearly distinct, 5–7 mm long, 5–8 mm wide, ovate, shortly acuminate, externally minutely and sparsely scaly, internally glabrous; calyx (Fig. 2l) ca. 15 mm long, half-divided, the lobes 5–6 mm wide, ovate, acute, externally lepidote, internally stellate-puberulent, nectaries apparently absent; petals 3–4 cm long, 1 cm wide, pink, oblong, externally densely lepidote, stellate pubescent on margins of claw; staminal column ca. 1.5 cm long, densely lanate at base (together with the petal bases forming a cushion), filamentiferous in the upper portion, the filaments 2–3 mm long; styles emergent from the staminal column, glabrous, free for distal 5 mm, the stigmas capitate, 1–1.5 mm in diameter. Capsules [immature] ovoid, acuminate, densely lepidote, "10-locular" [ex descr.]; seeds reniform ca. 3 mm long, densely lanate. Chromosome number unknown.

**Distribution.** Papua New Guinea; "along creek in garden regrowth and on riverbank"; below 200 m

**Phenology.** Collected in flower and fruit from July through August.

**ADDITIONAL SPECIMENS EXAMINED.** Papua New Guinea. WEST SEPIK: Aitape Subdistr., near Wnatipi village, on Bliri River, 650 ft, *Darbyshire & Hoogland* 8350 (A, L).



*Talipariti sepikense* is very similar to *T. pleijtei*, but they are sufficiently different to be accepted as distinct. In addition to the characters given in the key, *T. sepikense* has herbage that is more prominently lepidote than that of *T. pleijtei*.

**20. *Talipariti simile*** (Blume) Fryxell, comb. nov. *Hibiscus similis* Blume, Bijdrag 2: 73. 1825. *Paritium simile* (Blume) G. Don, Gen. hist. 1: 485. 1831. *Hibiscus tiliaceus* var. *similis* (Blume) Hochreutiner, Annuaire Conserv. Jard. Bot. Genève 15–16: 244. 1912. *Hibiscus tiliaceus* subsp. *similis* (Blume) Borssum Waalkes, Blumea 14: 33. 1966.—TYPE: INDONESIA. Java, *Blume s.n.* (lectotype, designated by Borssum Waalkes, 1966: P). [Authentic material was not found at L, fide Borssum Waalkes 1966, p. 34.]

*Hibiscus tiliaceus* var. *hirsutus* Hochreutiner, Annuaire Conserv. Jard. Bot. Genève 4: 64. 1900.—TYPE: INDONESIA. Java. Tjikoja, cr. in graminosis prope Buitenzorg, *Zollinger 132* (lectotype, designated by Borssum Waalkes, 1966: G; isolectotypes: BM, FI, L-2!, P).

*Hibiscus tortuosus* Wallich ex Prain, Bengal pl. 1: 268. 1903, non *Hibiscus tortuosus* Roxburgh, 1832. *Hibiscus prainii* Raizada & Chatterjee, Sci. & Cult. 26: 47. 1960.—TYPE: INDIA. *Wallich 1913.A* (holotype: CAL; isotype: K-W, labeled "1913.1").

Fig. 2d.

Trees to 20 m tall, the younger stems with minute arachnoid hairs and larger stellate hairs 1–1.5 mm long, the stems eventually glabrescent and purplish. Leaf blades ovate, 6–20 cm long, 5–24 cm wide, basally deeply cordate, the margin finely crenate-undulate to subentire, apically acute or acuminate, palmately 5–9-nerved, discolorous, the upper surface sparsely pubescent with scattered stellate hairs 0.5–1 mm in diameter, the lower surface whitish, the surface obscured by dense stellate pubescence, the hairs yellowish on the nerves; foliar nectaries 3–7, elongate, 5–25 mm long or sometimes even longer on midrib, and positioned distally on principal nerves, 1/3–2/3 the distance from base to apex of blade; petioles 4–11 cm long, half length of blade or less (sometimes longer), with pubescence like stem; stipules lance-oblong, sometimes asymmetrically so, 5–7 cm long, 1–1.5 cm wide, acute, externally stellate-hirsute (the hairs somewhat coarser than on the blade), internally strigose, the hairs mostly simple and antrorse, ca. 1 mm long, sometimes glabrous (e.g., *Pieters 2533*), deciduous, leaving annular scars. Flowers subsessile between a pair of reduced stipules, often borne on an elongated lateral branchlet and thus appearing long-pedicellate; involucre (Fig. 2d) cupuliform, 15–18 mm long (ca. half length of calyx), densely yellowish pubescent, ca. 10-toothed, the teeth 7–10 mm long, narrowly triangular; calyx (Fig. 2d) ca. 3 cm long, densely yellowish pubescent, nectaries very obscure or absent; petals 5–7 cm long, 3–4 cm wide, yellow with red center, more or less stellate-pubescent, the margin of claw hirsute; staminal column 3.5 cm long, glabrous, filamentiferous throughout, the filaments 2 mm long; styles and stigmas emergent from the staminal column, purplish, stigmas obliquely capitate, ca. 1 mm diameter. Capsules (Fig. 2d) ovoid (not beaked), ca. 2.5 cm long, ca. 2 cm in diameter, 5-locular, antrorsely hirsute; seeds not seen. Chromosome number unknown.

Phenology. Probably flowering throughout the year; fruits seldom seen, with abortive seeds.

Distribution. India, the Malay Peninsula, Sumatra, Java, and Borneo. "Lowlands and mountains up to ca. 1400 m in or near inhabited places, occasionally in



secondary vegetation, possibly as a relict of cultivation; never along or near the coast" (Borssum Waalkes 1966, p. 34).

ADDITIONAL SPECIMENS EXAMINED. **Indonesia.** JAVA. Buitenzorg, Tabanabon, 450 m, *Bakhuizen van den Brink* 7802 (L); Oudemansgracht te Buitenzorg, *Harreveld* 2537 (L); without locality, *Jung-huhn* 191 (L-2); Res. Preanger, Pangentjongan, NW Mt. Glunggung, 1300 m, reforestation, *Koorders* 10972 (L-2); [cult.], *Koorders* 13558 (L-2); Pekalongan (Res.), Subah, *Koorders* 13563 (L-2); Res. Semarang, Kedungdjati, *Koorders* 25127 (L), 25339 (L). Res. Benkam, Pangissisan, *Koorders* 4566 (L); Buababu, 700 m, *Popta* 324 (L-2). Hort. Bot. Bogor., 1867, *Teijsmann s.n.* (L-2).—KALIMANTAN: Duersin, *Korthals s.d.*[1836?], *s.n.* (L-3).—SUMATRA. West coast between Panti and Lubuk Sikaping, 400 m, *Borssum Waalkes* 1780 (L-2); without locality, 150 m, *Granhoff* 263 (L); Lamponges, Sepoetik, *Pieters* 2533 (L). **Malaysia.** NEGERI SEMBILAN: Kg. Sungai Layang, *Chin & Mustafa* 3295 (BISH, MO).

Prain (1903), Raizada and Chatterjee (1960), and Borssum Waalkes (1966) consider *T. simile* a hybrid of *T. macrophyllum* and *T. tiliaceum*. It is intermediate between the two species in most characteristics (cf. Figs. 2c, d, and i), and shows the distinctive distal positioning of the foliar nectaries that is also found in *P. macrophyllum* but in no other species of the genus. Its abortive seeds support the interpretation of hybridity. The question of how it propagates and maintains itself in nature, if it is characterized by sterility, remains unanswered. Borssum Waalkes (1966: 34) says "Presumably [it] does not really occur wild. It is often planted as a shade tree in the area," and many (most?) specimens are noted by their collectors as cultivated. It is propagated vegetatively (by cuttings) according to Koorders and Valetton (1895).

Use of the bark for rope is reported on a collector's label (*Koorders* 10972).

**21. *Talipariti tiliaceum* (L.) Fryxell, comb. nov. *Hibiscus tiliaceus* L., Sp. pl. 694.**

1753. *Paritium tiliaceum* (L.) St.-Hilaire, Fl. Bras. Merid. 1: 256. 1828.—

TYPE: Herb. Hermann, vol. 3, fol. 51, *Linnaeus no.* 258 (holotype: BM).

Figs. 1b, 2i, 5.

Shrubs or trees 3–8 m tall, often with low spreading branches, the stems minutely and softly pubescent (to glabrescent), the hairs stellate and subarachnoid. Leaf blades coriaceous, broadly ovate (sometimes obscurely pentagonal), mostly 6–13 cm long, slightly wider than long, basally deeply cordate, the margin entire to obscurely denticulate or crenulate, apically short-acuminate, discolorous, glabrate above, minutely and densely stellate-pubescent beneath to nearly glabrous, palmately or pedately 7–9-nerved, the veins raised beneath, the principal (1–5) veins abaxially with a nectary at the base of each, the nectaries 2–7 mm long; petioles 4–12 cm long (commonly subequal to the blade), with pubescence like stem but often denser, especially distally; stipules (Fig. 1b) 1.5–4 cm long, 8–14 mm wide, oblong-lanceolate, sessile and amplexicaul enclosing the apical bud, acute, many-veined, stellate-puberulent externally, glabrous internally, deciduous, leaving annular scars. Flowers solitary in the axils (or aggregated distally with reduced leaves); pedicels 0.5–3 cm long (above the articulation), often congested at the apices of the branches, minutely stellate-pubescent; involucre (Fig. 2i) cupuliform, half length of calyx or less, obscurely puberulent, 8–12 (–20)-dentate, the teeth 1–6 (–20) mm long, triangular to lanceolate, the sinuses broadly rounded; calyx (Fig. 2i) 1.5–2 cm long, densely stellate-pubescent, more than half-divided, the lobes lanceolate-acute, 12–15 mm long, 6–8 mm wide, with a nectary medially positioned on midrib of each lobe (nectaries sometimes absent); corolla yellow



(fading orange, sometimes drying dark greenish) with or without a red center, the petals 4–6 (–8) cm long, externally densely and minutely pubescent, internally glabrous; staminal column 2.5–3 cm long, glabrous, pallid, surmounted by 5 triangular teeth, filamentiferous nearly the length of the column, the filaments 1–3 mm long; styles emergent from staminal column, stigmas 5, capitate, 2 mm in diameter, purplish. Capsule subglobose or slightly obovoid, subequal to calyx, 1.5–2 cm long, 1.5–2 cm in diameter, 5-locular, densely antrorsely pubescent, the hairs yellowish or brownish; seeds numerous, 4 mm long, minutely papillate. Chromosome number (var. *tiliaceum*):  $2n = \text{ca. } 80$  (Skovsted 1941),  $2n = \text{ca. } 92$  (Skovsted 1935),  $2n = 96$  (Skottsberg 1955; Youngman 1927).

Phenology. Probably flowering and fruiting throughout the year, unless a dry season induces a hiatus.

The most difficult problem in dealing with the taxonomy of *Talipariti* is how to interpret *T. tiliaceum* sensu lato. It is a highly variable taxon but may be only imperfectly subdivided into constituent taxa. I have taken a middle road here, recognizing where possible the clearly distinct taxa in specific rank (e.g., *T. hastatum*, *T. hamabo*, *T. crestaense*, etc.) but not submerging all of the yellow-flowered representatives into an olio called *T. tiliaceum*, as some authors have done. Even with the clear-cut segregates removed, what remains is highly variable and not easily interpreted. On the one hand, the neotropical material of this complex is relatively uniform and fairly readily characterized. On the other hand, the paleotropical material (including some introductions into the New World in cultivation) retains a great deal of variability, including many of the character states that are common in the neotropical plants. Therefore, the neotropical plants are recognized in infraspecific rank as *T. tiliaceum* var. *pernambucense*, and the name *T. tiliaceum* var. *tiliaceum* is reserved for the highly variable residuum. Future studies of these plants may reveal a pattern in the variability that has not yet been discerned. This distinction between the New and Old World representatives was already noted by St. Hilaire (1828). When he proposed the combination *Paritium tiliaceum*, he expressed doubt that the plant he was describing from Guaratuba, Brazil (at the border of the provinces of São Paulo and Santa Catarina), was the same as the Old World species of Linnaeus, and suggested that it might be a variety of this species or even a distinct species.

Indeed, there are probably additional as yet unrecognized species (or infraspecific taxa) hidden within the residual variability of what is here treated as var. *tiliaceum*. For example, there are two specimens with distinctively trilobulate, deeply cordate leaves (Marianas Islands, Rota, *Evans 2020* [US]; and Caroline Islands, Woleia Atoll, *Alkire 28* [US]) that are unlike anything otherwise seen in leaf form in a broadly conceived *T. tiliaceum*. They clearly pertain to *Talipariti* on the basis of the foliar nectaries and stipule scars; however, both are sterile specimens, and their evaluation, therefore, awaits the collection of additional, fertile material. It is also possible that this leaf form is merely a manifestation of the sterile condition. Field studies will probably be necessary to evaluate this possibility. Christophersen (1935: 143) notes that “Dr. F. B. H. Brown has drawn my attention to the growth in the Marquesas Islands of crenate, glabrate leaves on sterile branches of trees which otherwise have entire, densely tomentose leaves. This species [*T. tiliaceum*] is variable with little constancy in its variations. Its polymorphic features will add to the difficulties of a satisfactory classification.”

One interpretation of this distributional pattern is that the relatively uniform var. *pernambucense* may be a recent introduction from the Old World that spread



throughout the Americas without diversifying significantly. Its uniformity may exemplify the founder effect of a unique dispersal event. An alternative interpretation is that the New World material was at some time introduced into the Old World, and that interbreeding and hybrid swarms gave rise to the very high level of variability that now characterizes the paleotropical region. Evidence to distinguish between these two alternatives is not in hand at the present time.

#### KEY TO THE VARIETIES OF TALIPARITI TILIACEUM

- Corolla yellow with prominent red center; stipule scars nearly straight or slightly curved; epidermis of involucre and stipules visible through pubescence. 21a. *T. tiliaceum* var. *tiliaceum*.  
 Corolla yellow without red center; stipule scars markedly curved; epidermis of involucre and stipules obscured by pubescence. 21b. *T. tiliaceum* var. *pernambucense*.

#### 21a. *Talipariti tiliaceum* var. *tiliaceum*.

*Hibiscus circinnatus* Willdenow, Enum. pl. hort. berol. 735. 1809. *Paritium circinnatum* (Willdenow) G. Don, Gen. hist. 1: 485. 1831.—TYPE: ex Hort. Schoenbr. 1804 (holotype: B-W no. 12862!).

*Hibiscus porophyllus* Vellozo, Fl. Flum. 7: pl. 28. 1825 [1829].—TYPE: Vellozo's plate no. 28 (lectotype, here designated).

*Hibiscus tiliaceus* var. *purpurascens* Seemann, Fl. Vit. 18. 1865.—TYPE: FIJI. Somosomo, Taveuni, 1860, *Seemann 24* (holotype: K!; isotypes: GH! K!).

*Pariti tiliaceum* f. *albiflorum* O. Degener & Greenwell, Fl. Haw., fam. 221. 1956.—TYPE: U.S.A. Hawaii. Oahu, Honolulu, 1930 Ualakaa St., from slip of plant brought from Paparas Distr., Tahiti, 24 May 1933, *Wilder s.n.* (holotype: BISH!).

Distribution. Shores of the Indian Ocean and western Pacific Ocean; at or near sea level on riverbanks or in mangrove associations, sometimes at higher elevation (e.g., *Craven & Schodde 104*); sometimes cultivated elsewhere in the tropics. Merrill (1920) disputed the ideas of Cook and Cook (1918) concerning the distribution of *H. tiliaceus* and the role played by humans in achieving its "pan-tropical" range. The authors, however, were unaware that the Old World and New World plants are in fact two distinct taxa, vicariads, and that transport from the paleotropics to the neotropics (or vice-versa) had in fact not occurred, at least not in terms of humans transporting cultivated plants.

Illustrations. Bates (1965: 72, fig. 2A); Feng (1984: 16, figs. 2–3); Hochreutiner (1955: 17, fig. IV, 3–5); Hu (1955: pl. 19, fig. 6); Li (1963: 546, fig. 211); Marais & Friedmann (1987: 28, pl. 7, figs. 4–5); Ngwe (1971: 238, fig. 30); Sivarajan & Pradeep (1995: 92, fig. 28); Walker (1950, fig. 127); Wight (1838: pl. 7).

ADDITIONAL SPECIMENS EXAMINED. **China.** HAINAN: Taipin, *Gressit 1094* (MO); Yaichow, *How 70884, 70460* (MO).—HONG KONG: Lantau Island, Tungchung and vicinity, Taipo, *Taam 1736* (US).—KWANGTUNG: Honam Island, *Levine 957* (MO).—TAIWAN: Koken, prov. Kagi, *Wilson 9906* (US). **India.** Calcutta, Royal Botanic Garden [cult.], *Raizada 21717* (MO); E. Bengal, Gaghkali River, Kurishkool, *Sinclair 3964* (US). **Indonesia.** JAVA: Karimondjava Island, near coast, *Hoogerwerf 67* (BISH); Pasirputih, *Fosberg 39740* (BISH).—SUMATRA: Enggano Island, Boea-Boea, *Lütjeharms 3878* (BISH). **Japan.** BONIN ISLANDS: Iwojima, Motoyama, *Ono 193654* (MO); Ogasawara [Bonin] Islands, Chichijima, Kominato Beach, *Woolliams & Tannowa 15* (PTBG).—RYUKYU ISLANDS: Taketomi Shima, near Aibaru Saki, *Fosberg 37580* (US); Nikao Jima, N of Yaabari, 2.3 km ESE of Hirara, *Fosberg 38198* (US). **Singapore:** Labrador Nature Reserve, 0.5 mi W of Tandjong Borlayer on south coast, *Canright 1037* (ASU, TEX); Kampong Pulau Damar, *Sinclair 5285* (US). **The Philippines:** LUZON: Cagayan, Bagio Cove, *Allen 144-81* (BISH); Mt. Province, Amganad, Banaue, *Conklin & del Rosarie*



72423 (K, PNH); Mt. Province, Putan, Banaue, Ifugao, *Conklin & Buwaya I-864* (PNH), *Newell 5* (PNH); Prov. Bataan, Lamao River, along beach, *Williams 197* (NY, TEX).—QUEZON: Real, Kinabubaker, *Rojo 145* (MO).

**Australia.** NORTHERN TERRITORY: between coastal dune and mangrove, *Latz 3261* (MO); Berry Springs (12°42'S, 131°0'E) on creekbank, *Must 1339* (CANB, DNA, MO); Wessel Islands (11°11'S, 136°44'E).—QUEENSLAND: Rockhampton, *Dietrich 406* (MO); Russell River, National Park Reserve 1353, 17°16'S, 145°56'E, 2 m, at edge of swamp along river, *Gray 2188* (MO); Green Island, Sand Cay, north beach crest, 16°46'S, 145°54'E, *Stoddart 4242* (US); Cook Distr., Great Barrier Reef Islands, low wooded island, 15°05'S, 145°23'E, *Stoddart 4580* (MO).

**Papua New Guinea.** BOUGAINVILLE. Bougainville island, near Koniguru, ca. 10 mi N of Buin, *Craven & Schodde 104* (US).—D'ENTRECASTEAUX ISLANDS: Milne Bat Distr., Bolu Bolu, Goodenough Island, 20 m, *Brass 24423* (US).—MADANG: Distr. Bogia, Laing Island, 04°10'25"S, 144°52'20"E, *Iserentant 9018* (BR, MO).—NEW IRELAND: Cape entrance, North Coast, Lavongai (New Hanover) subdistr. Lamet, 02°22'S, 150°12'E, *Croft & Lelean 65381* (LAE, MO).—WEST NEW BRITAIN: SW of Gilnit, on W side of Itni River, Talasea, 05°45'S, 148°32'E, *Frodin NGF-26234* (NY).

**Caroline Islands.** Woleia Atoll, Falalis Inlet, *Alkire 7* (US), *Alkire 27* (US); Kusaie, Lela Island, *Fosberg 26682* (US); Ponape, Agric. Exper. Sta. grounds, *Glassman 2565* (US). **Fiji.** Makodronga Island, *Degener & Ordoñez 13804* (NY); Kandavu, Namalata Isthmus region, *Smith 16* (NY); Koro, coastal thickets, *Smith 1081* (NY); Fulanga, coastal thickets, *Smith 1223* (NY); Viti Levu, Mba, shores of Mba River near its mouth, *Smith 4741* (NY); Ngau, shore of Herald Bay, vicinity of Sawaeicke, *Smith 7947* (NY); Viti Levu, Serua, coastal strip near Ngaloa, *Smith 9683* (NY); Viti Levu, Suva Point, *Weiner 71-7-49* (BISH); without locality, *Wilkes s.n.* (NY). **Kiribati.** Phoenix Islands, Central Pacific, Canton Island [cult.], *Fosberg & Stoddart 54900* (NY, TEX); Bikenibeu Island, Tarawa Atoll, in village [cult.?], *Herbst & Allerton 2666* (PTBG). **Maldives.** Addu Atoll, Gan Island, seashore, *Sigee 5* (US). **Marianas Islands.** Sariguan, gulley behind village, *Evans 2364* (US); Anatahan, vic. of beach near NW tip of island, *Evans 2459* (US); Rota, Rota (Sonson) and vicinity, alt. 1–10 m, *Fosberg 25073* (MO); Saipan, Tanapag, edges of mangrove swamp, *Fosberg 25263* (US). **Marquesas Islands.** Hu'ei vicinity, between Hanavave and Omoa, *Decker 2450* (MO); Fatu Hiva, W edge of Omoa village, along Vaitopii River near ocean, *Lorence & Wagner 6220* (PTBG). **Samoa.** Ta'u, just W of Fiti'uta, *Whistler 7906* (PTBG). **Society Islands.** Maupiti Island, saddle between Mt. Taharae and Rocher Hotumuatae, *Fosberg 64955* (MO); Tahiti, Distr. Papenoo, *Leland et al. 73* (MO); Raiatea, 3rd valley S of Faaroa Bay, *Moore 236* (MO); Mopelia Atoll, *Sachét 917* (MO). **Tonga:** Sopu, W of Nuku'alofa, near beach, *Yuncker 15027* (NY, TEX, US).

**Ivory Coast:** Azuretti, on beach E of Abidjan, *Fosberg 40622* (US). **Kenya:** Kwale Dostric, Funzi Island, *Frazier 1012* (US). **Liberia:** Sinoe Co., Kru Fishtown, *Baldwin 11612* (US). **Madagascar:** Antsiranana, Nosy-Be, 13°24'30"S, 48°18'15"E, *Antilahamena 214* (MO, TEX); Antsiranana, Nosybe, Lokobe Reserve Integrale, 13°25'25"S, 48°18'48"W, *Malcomber & Antilahimena 2665* (LL, MO). **Mauritius.** Pointe Butte aux Sables, 19°59'S, 57°38'E, *Sauer 2731* (US). **Natal:** Distr. Durban, *Rudatis 1510* (US). "South Africa" [Natal?], *Krause 78* (MO). **Seychelles.** Aldabra Island, West Island, Anse Var, *Fosberg & McNae 49648* (US), *Stoddard 945* (US); Cousin Island, *Fosberg 52170* (US).

**U.S.A.** FLORIDA: Dade County, Rte. 1 just N of SW 304th Street [cult.], *Hill 16064* (NY, TEX).—HAWAII: Molokai, Kamalo Gulch, *Degener 6046* (MO); Kauai, along the Hanapepe River, *Heller 2203* (MO); Pacific Tropical Botanic Garden, Lawai Valley, upper Four-House Canyon, *Herbst 2331* (MO); Kau District, Hawaii Volcanoes National Park, near Volcano House Hotel [cult.], *Lorence 6331* (PNBG); Oahu, s. loc., *Mann & Brigham 86* (MO); Oahu, Waimea Arboretum [cult., ex Raiatea], *Simon 74P477* (BISH). **Brazil.** Rio de Janeiro, cultivada à beira da Lagoa Rodrigo de Freitas, em frente à Sociedade Hípica Brasileira, *Carauta 617* [6249] (TEX); Rio [de Janeiro], *Glaziou 18887* (US). **Peru.** LORETO: Iquitos, cultivated in park, *Killip & Smith 29827* (US); near Iquitos, *Williams 1302* (US). **Bolivia.** SANTA CRUZ: W side of Santa Cruz, 17°47'S, 63°12'W, cultivated ornamental tree, *Nee 36366* (NY, TEX).

In commenting on Seemann's var. *purpurascens*, Gray (1862) noted: "Nothing in the specimens to distinguish them from *P. tiliaceum*," to which Seemann responded "But the habit of the tree is very different, and the leaves have a purplish hue which they loose [sic] in drying. The natives call it the "red" Vau (Vau damu damu)." I have seen photographic images on the internet of purple-leaved forms cultivated in Tahiti (courtesy of Dick Johnson) that may well be what Seemann (1865) described. The purple foliage is indeed distinctive, but such variants have been selected in many cultivated plants, and that characteristic alone does not



merit taxonomic recognition. Seemann's reference to a different habit of the trees is not borne out by the photographs I saw.

The bark of var. *tiliaceum* is used for fiber (*Fosberg* 26682) and in weaving (*Alkire* 7) and the wood for various uses, including making outriggers (*Fosberg* 26682), canoes (*Alkire* 27), and fence posts (*Craven & Schodde* 104). The leaves are used medicinally for wrapping of bone fractures (*Weiner* 71-7-49).

**21b. *Talipariti tiliaceum* var. *pernambucense*** (Arruda) Fryxell, comb. nov. *Hibiscus pernambucensis* Arruda, Diss. Pl. Brazil 44. 1810. *Paritium pernambucense* (Arruda) G. Don, Gen. hist. 1: 485. 1831 [as "*Paritium pernambucense* (Bertoloni) G. Don"]. *Hibiscus tiliaceus* var. *pernambucensis* (Arruda) I. M. Johnston, Sargentia 8: 196. 1949 [as "*Hibiscus tiliaceus* var. *pernambucensis* (Bertoloni) I. M. Johnston"]. *Hibiscus tiliaceus* subsp. *pernambucensis* (Arruda) Castellanos, Sellowia 19: 50. 1967.—TYPE: BRAZIL. Pernambuco (holotype: unknown).—BRAZIL. Paraná: Mun. Guaratuba, Boa Vista, beira Rio Sai-Guaçu, *Oliveira* 229 (neotype, here designated: US!; isoneotype: MBM).

*Hibiscus bracteosus* DC., Prodr. 1: 455. 1824.—TYPE: Icones Florae Mexicanae s.n.! (Torner Collection acc. no. 6331.1001, Hunt Institute). Cf. copy at G, as photo F-30502.

*Hibiscus arboreus* Hamilton, Prodr. Pl. Ind. Occid. 49. 1825.—TYPE: GUADELOUPE. *Desvaux* s.n. (holotype: P).

*Hibiscus fragrantissimus* Sessé & Mociño, Pl. Nov. Hisp. 113. 1889.—TYPE: MEXICO. Sinaloa: Mazatlán (holotype: unknown).

*Pariti tiliaceum* f. *immaculatum* O. Degener & Greenwell, Fl. Haw. fam. 221. 1956. *Hibiscus tiliaceus* f. *immaculatus* (O. Degener & Greenwell) St. John, Mem. Pacific Trop. Bot. Gard. 1: 230. 1973.—TYPE: U.S.A. Hawaii. Kauai, Kipukai, Jul 1948, *Waterhouse* 24014 (holotype: BISH?; isotypes: BISH!, US!).

Fig. 5.

Distribution. Neotropics; in coastal habitats such as riverbanks and mangrove associations.

Additional illustrations. Cervantes Aceves (1992: 153, fig. 38), Chiea & Silva 1992, figs. 1–4), Fryxell (2000: 198, fig. 124, as *H. pernambucensis*), Little & Wadsworth 1964: 327, fig. 150, as *H. tiliaceus*); Meninger (1962: pl. 198\* as *H. tiliaceus*), Robyns (1966: 503, fig. 1, as *H. tiliaceus*); Wiggins & Porter (1971: 679, fig. 186, as *H. tiliaceus*).

ADDITIONAL SPECIMENS EXAMINED. **Mexico.** CHIAPAS: Las Garzas, Acapetagua, *Matuda* 2730 (LL, MEXU).—JALISCO: N of Puerto Vallarta, *Dieterle* 3115 (MICH); Mpio. La Huerta, beach near Rancho Cuixmala, 19°21'N, 104°58'W, *Rothschild & Upson* 387 (TEX, UCR).—MICHOACÁN/GUERRERO: embouchure du Río Balsas, *Langlassé* 148 (US).—NAYARIT: Mpio. Bahía de Banderas, duna costera entre el Hotel Villa Varadero y la desembocadura del río, *Cházaro & Montes* 6332 (TEX-2); Tres Mariás Islds., María Magdalena Isld., seashore, *Maltby* 172 (US); Río La Tovara, SE of San Blas, 21°32'N, 105°14'30"W, *Van Devender* 94-38 (ARIZ, TEX); Socorro Island, NE slope above cove 2.5 km E of Cabo Henslow, 18°49'N, 110°59.5'W, *Moran* 25547 (US); San Blas, river areas by estuaries, *Wilson* 11081 (TEX).—QUINTANA ROO: 3 km al S de Puerto Morelos, *Cabrera* 11508 (MEXU, TEX).—TAMAULIPAS: Mpio. Aldama, on coast 10–15 mi S of Barra de Tordo, *Fryxell* 3712 (CHAPA, ENCB, GB, MEXU, MICH, NY, TEX, US); coastal dunes near Moron, *LeSueur* 279 (TEX).—VERACRUZ: Tecolutla, 24 Jun 1947, *Johnston* s.n. (TEX); Mpio. Tuxpan, ca. 6 km al N del Río Tuxpan, sobre la playa, *Koch* 7845 (CHAPA, TEX); Playa Paraíso, a 30 km al NE de Ciudad Cardel, *Novelo* 372



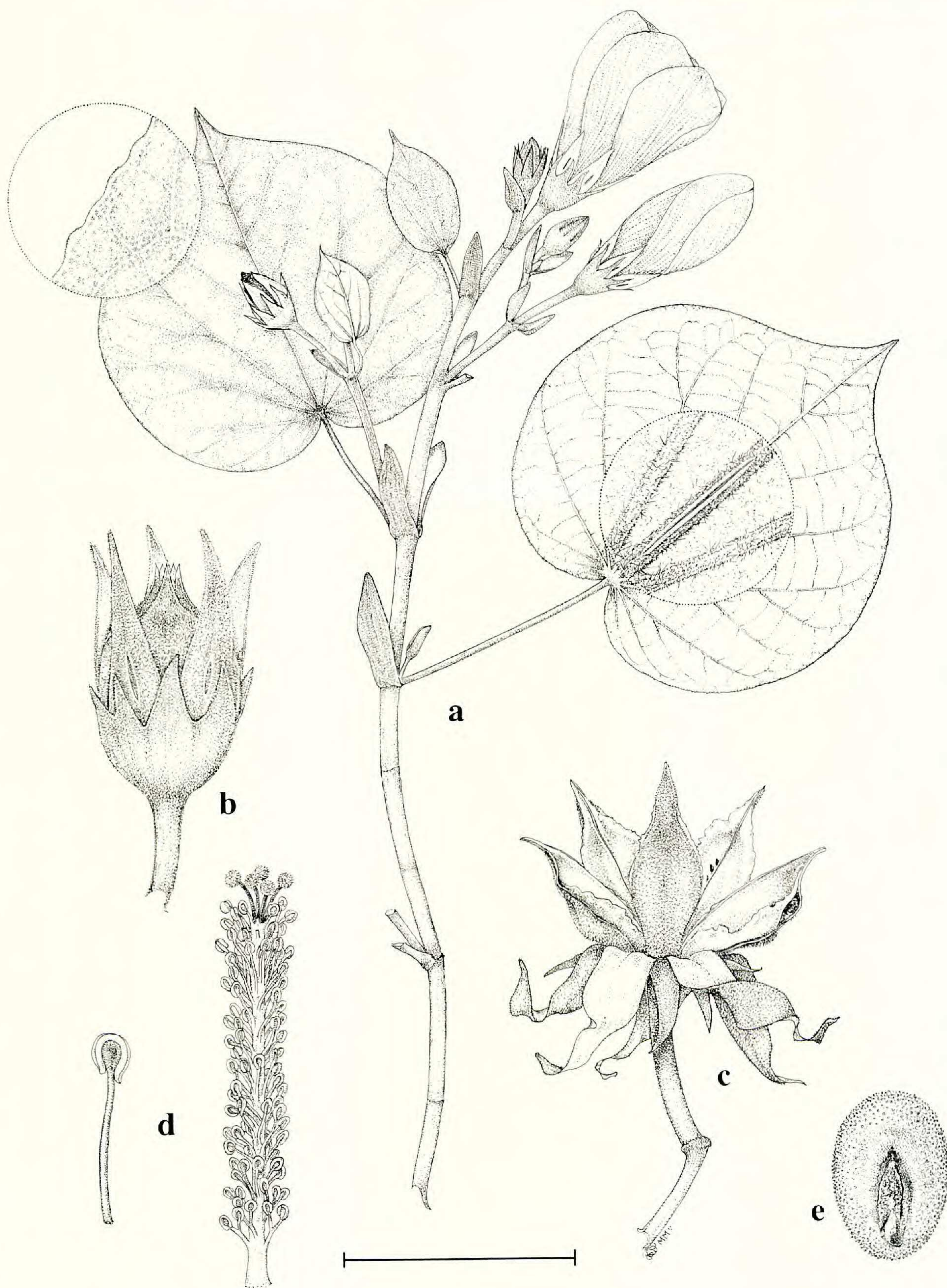


FIG. 5. *Talipariti tiliaceum* var. *pernambucense*. a. Flowering branch, with margin of leaf and nectary on abaxial midrib enlarged. b. Immature fruit showing involucre and calyx lobes with abaxial nectaries. c. Fruit after dehiscence. d. Androecium and stigmas, and one stamen. e. Seed. Scale: a, bar = 6 cm for habit, 6 mm for leaf margin, 1.2 cm for abaxial nectary. b, c, bar = 2 cm. d, bar = 2 cm for whole androecium, 5 mm for stamen. e, bar = 6 mm. Drawn for *Flora Novo-Galiciana* by Karin Douthit. (Based on: a–c, *Dieterle 3115*; d, *Lott 2555*; e, *Stewart & Percival 84-1*.)

(MEXU, TEX); Estero de la Silveña cerca de Tecolutla, *Rzedowski 1993* (ENCB, TEX). **Belize.** Northern Highway, 4 mi NW from Belize, *Wiley 146* (LL). **Honduras.** COLÓN: Río Guaimoreto near opening of Laguna Guaimoreto, 15°57'30"N, 85°54'30"W, *Saunders 268* (TEX). **Nicaragua.** RIVAS: Playa El Coco, 11°09'N, 85°47'W, *Stevens 3795* (MO, TEX). **Costa Rica.** GUANACASTE: Parque Nacional



Santa Rosa, road to Estero Real, *Huft et al.* 2086 (LL, MO).—PUNTARENAS: Parque Nacional Corcovado, Sirena, 08°27–30'N, 83°33–38'W, *Kernan* 3 (MO, TEX). **Panama.** CHIRIQUI: Burica Peninsula, Guanábano, 2–4 km S of the center of Puerto Armuelles, *Busey* 489 (LL, MO).—COCLÉ: Sta. Clara Beach, *D'Arcy & Croat* 4090 (MO, TEX).—PANAMÁ: Playa Venado, 08°54'N, 79°35'W, *Knapp* 1916 (LL, MO).

**Grand Cayman.** Western District: several miles N of Georgetown, *Crosby et al.* 15 (DUKE, LL). **Dominican Republic.** LA ALTAGRACÍA: Bahía de Maimón, 18°51'N, 68°38'W, *Zanoni & Jiménez* 44510 (NY, TEX).—SANTO DOMINGO: edge of Río Jania, *Ekman* 12489 (LL). **Jamaica.** St. Ann Parish: mouth of the Pear Tree Bottom River, 1.5 mi W of Runaway Bay, *Proctor* 23908 (LL); St. Catherine Parish, near shore of Manatee Bay, *Proctor* 29159 (LL); Hanover Parish: Rutland Point, S of Bloody Bay, *Proctor* 32482 (LL). **Dominica.** St. John Parish, Indian River, S side of Portsmouth, *Hill* 22026 (TEX).

**Colombia.** CHOCÓ: Nuqui-Pangui, Playa la Olimpica, 05°19'N, 77°17'W, *Gómez et al.* 398A (HUA, LL).—VALLE: costa del Pacífico, Isla del Guayabal, en la desembocadura del Río Cajambre, *Cuatre-casas* 16175 (US). **Ecuador.** EL ORO: Puerto Juli, *Albert de Escobar* 980a (TEX); Arch. Jambelí, Isla de Amor, *Cornejo & Bonifaz* 5986 (TEX).—GALÁPAGOS: Cocos Island, *Stewart* 302 (US).—MANABÍ: Las Tunas, *Bonifaz & Cornejo* 3521A (TEX). **Guyana.** Essequibo Isl.-W. Demerara, 06°50'N, 58°28'W, *Henkel et al.* 2667 (TEX, US). **Surinam.** Distr. Commewijne, *Hekking* 821 (LL). **Brazil.** BAHIA: Canavieiras, *Lanna* 735 & *Castellanos* 25487 (LL).—RIO DE JANEIRO: Rio de Janeiro, *Glaziou* 18887 (US). **Argentina.** CORRIENTES: Facultad de Ciencias Agrarias, cultivado (procede de Brasil, SP, Caraguatatuba, manglar), *Krapovickas* 32969 (CTES, TEX-2).

Don (1831) and Johnston (1949) attributed the basionym *Hibiscus pernambucensis* to Bertoloni (Exc. Re Herb. 13. 1820), but Hochreutiner (1900: 64) provides evidence that Bertoloni's use of the name was based on that of Arruda. Nomenclatural problems relating to the names *H. pernambucensis* and *H. abutiloides* Willdenow (see below under Doubtful and Excluded Names) are more fully discussed by Fryxell in Howard (1989: 226).

**22. Talipariti tortuosum** (Roxburgh) Fryxell, comb. nov. *Hibiscus tortuosus* Roxburgh, Fl. Ind. 3: 192. 1832, non *Hibiscus tortuosus* Wallich ex Prain, 1903. *Pariti tortuosum* (Roxburgh) J. O. Voigt, Hort. Suburb. Calcutt. 120. 1845. *Hibiscus tiliaceus* var. *tortuosus* (Roxburgh) Masters in Hooker, Fl. Brit. Ind. 1: 343. 1872.—TYPE: INDIA. *Wallich* 1913.B (holotype: K-W).

Bushy trees with numerous, widely spreading, crooked branches, the twigs sparsely pubescent to glabrescent, purplish (?). Leaf blades broadly rotund-cordate, ca. 10 cm long, 10 cm wide, minutely crenulate, acuminate, minutely and obscurely pubescent above, densely hoary-pubescent beneath, the foliar nectaries absent; petioles 2–4 cm long, densely stellate pubescent especially distally; stipules obliquely oblong to ovate-lanceolate, to 2.5 cm long, ca. 1 cm wide, densely pubescent, deciduous. Peduncles terminal, 2–3-flowered; the pedicels axillary, densely stellate-pubescent, the flowers drooping [ex descr.]; involucellar bracts 7–10, distinct, lanceolate, equalling the calyx, densely pubescent; calyx 5-parted, densely pubescent; petals 7 cm long, bright yellow with a crimson center, campanulate; styles 5, the stigmas dark red. Capsule equaling the calyx, ovoid, acute, densely stellate-pubescent, 5-carpelled (but seemingly 10-celled because of double partition); seeds 2–4 per carpel, obovate-reniform. [This description is taken from Roxburgh's description and from the specimen cited below.]

SPECIMEN EXAMINED. **India.** Calcutta Botanic Garden, 3 Jul 1883, *Brace s.n.* (NY).

Although poorly known, *T. tortuosum* stands out as one of the yellow-flowered species with distinct involucellar bracts, along with *T. pseudotiliaceum*, which differs in having fewer, broader involucellar bracts (Fig. 2n).



Roxburgh (1832) and Masters in Hooker (1872) cite Rheede's plate 30 under *H. tortuosus* and *H. tiliaceus* var. *tortuosus*, respectively. The plate, however, does not have the long involucler that Roxburgh uses (among other characters) to distinguish *H. tortuosus* from *H. tiliaceus*.

#### DOUBTFUL AND EXCLUDED NAMES

*Hibiscus abutiloides* Willdenow, Enum. Pl. Hort. Berol. 736. 1809. *Paritium abutiloides* (Willdenow) G. Don, Gen. hist. 1: 485. 1831. *Paritium elatum* var. *abutiloides* (Willdenow) Grisebach, Fl. Brit. W. Ind. Islds. 87. 1859. *Hibiscus tiliaceus* var. *abutiloides* (Willdenow) Hochreutiner, Nova Guinea 14: 163. 1914.—TYPE: unknown.—The type specimen apparently is not extant (Borssum Waalkes 1966; Hiepko 1972), and the original description is too general to allow for determination of the species to which this name applies.

*Hibiscus guineensis* DC., Prodr. 1: 454. 1824. *Paritium guineense* (DC.) G. Don, Gen. hist. 1: 485. 1831.—TYPE: "Côte de Quoja," 1820, *Baclé s.n.* (holotype: G-DC!).—Because the type specimen is sterile, the name cannot be assigned with certainty; perhaps it is a synonym of *Talipariti tiliaceum*.

*Hibiscus tiliaceus* var. *glaber* ["*glabra*"] Matsumura ex Hattori, J. Coll. Sci. Imp. Univ. Tokyo 23(10): 30. 1910, nomen nudum.

*Hibiscus tiliaefolius* in Salisbury, Prodr. Stirp. 383. 1796.—Error for *Hibiscus tiliaceus* L.

*Hibiscus tortuosus* Roxburgh ex Wallich, Numer. List ["Wallich's Catalogue"] 1913. 1829, nomen nudum.

*Pariti tiliaefolium* in Nakai, Fl. Sylvat. Koreana 21: 101. 1936.—Nakai's combination was based on Salisbury's (Prodr. Stirp. 383. 1796.) erroneous citation of "*Hibiscus tiliaefolius*" for *Hibiscus tiliaceus* L.

*Paritium gangeticum* G. Don = *Thespesia lampas* (Cavanilles) Dalzell & Gibson.

*Paritium paoui* Vieillard, Ann. Sci. Nat. Bot., sér. 4, 16: 75. 1862.—TYPE: unknown.—The description is not sufficient to assign the name with certainty.

*Paritium purpurascens* Seemann, Bonplandia 9: 254. 1861, nomen nudum.

*Paritium quinquelobum* Hooker f. = *Hibiscus sterculiaefolius* (Guillemin & Perrottet) Steudel.

*Paritium sterculiaefolium* Guillemin & Perrottet = *Hibiscus sterculiaefolius* (Guillemin & Perrottet) Steudel.

*Paritium virgatum* Guillemin & Perrottet = *Hibiscus perrottetii* Steudel, non *Hibiscus virgatus* Blume.

*Paritium wrayae* (Lindley) Walpers = *Alyogyne huegelii* (Endlicher) Fryxell.



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